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Sustainable Property Portfolio Management –

With Special Consideration of Energy Efficiency Improvements in the Property Portfolio Stock

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Preface

In the property industry, the sustainability agenda has begun to attract more attention only recently, as a wider audience has become aware of the increasing role of real estate in the protection of the natural environment. The real estate sector accounts for a large proportion of worldwide energy and resource consumption, as well as carbon dioxide emissions. However, it also offers among the greatest potential for greenhouse gas reduction and environmental conservation. These aspects have led to the real estate sector playing a major role in worldwide environmental protection efforts. Governments are increasingly introducing and tightening legislation regarding buildings and the natural environment, investment fund managers are seeking sustainable indirect property investments and prospective tenants are increasingly looking for sustainable and energy-efficient buildings. These issues have induced real estate market participants to improve their understanding of the key role they play in delivering a sustainable economy.

In spite of an increasingly greater acceptance of the sustainability agenda, there is still controversy over whether or to what degree managers should adhere to sustainability principles during their strategic decision-making processes. This has often been phrased as the question "Can a firm do well while doing good?" A conclusive answer to this question has been impeded by the failure to reach a consensus on which particular responsibilities belong to which companies and what may constitute relevant mechanisms and tools for managing sustainability. In addition, the development of a widely accepted, sector-specific sustainability management framework represents a prerequisite for the widespread consideration of the sustainability agenda in companies' business operations. In the present dissertation, the author, Dipl.-Kfm. Helmut Schleich, addresses this gap in real estate scholarship and practice. In particular, this study identifies potential sustainability strategies and mechanisms appropriate for application in property portfolio management. The viability of the proposed tools in real estate practice is tested through a series of interviews.

The detailed structure of the present study, which the faculty of business, economics and management information systems (University of Regensburg) accepted as a dissertation, is as follows. In Chapter 2, the basic theoretical framework provided by the "House of Real Estate" is complemented by the theories of sustainability and strategic property portfolio management. Using strategic property portfolio management as a conceptual and theoretical

foundation ensures that the sustainability strategies and mechanisms to be developed are directly linked to a property company's business strategy and operations. Chapter 3 illustrates the peculiarities of sustainability in the property sector, which forms the basis for the subsequent analysis of sustainability drivers for property investors. Thereafter, a brief consideration of the impact of the sustainability agenda on the economic performance of buildings is outlined. Having identified sustainability drivers for property companies, Chapter 4 analyzes various information sources such as academic papers, property companies' CSR reports and ratings agencies' sustainability assessment schemes. In so doing, this chapter identifies mechanisms for integrating sustainability aspects into the management process of property portfolios. On the basis of this investigation, a comprehensive best practice catalogue of strategies and practices for addressing sustainability in the management of property portfolios is proposed. Subsequently, Chapter 5 tests and ensures the plausibility of strategies and mechanisms suggested in Chapter 4 by investigating their suitability for German property investors through a series of interviews. In addition, interviewing German property investors enables an examination of their activities for addressing sustainability, and for the proposed framework to be supplemented and adapted.

From a practical viewpoint, the dissertation provides detailed practical guidance to corporate leaders for developing and integrating sustainability initiatives into corporate strategies and business activities. The focus of the research project thereby falls on the real estate investor's perspective. Because the proposed sustainability management approach comprises the entire universe of a property investor's business operations, this dissertation is of equal interest to asset and property managers, property developers and occupants.

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Foreword

In the real estate industry, sustainability and corporate social responsibility have been demanding increasing attention over the past few years. Different kinds of actions, such as green building concepts and energy saving tips, have been introduced to the real estate market players to address the sustainability agenda. Despite the positive developments made in recent years, there are still some obstacles on the way. In particular, the lack of consensus on how to define a sustainable firm, resulting from the absence of a common, comprehensive framework of generally accepted strategies, tools, and measurements, has prevented the vast majority of property companies from adopting sustainability-oriented management measures.

In order to address this gap, the present dissertation develops a strategic approach to consider sustainability in property portfolio management. For this purpose, in a first step, the dissertation analyzes various sustainability drivers, and, on the basis of this, identifies the scope and components of a holistic sustainability management approach for real estate investment and management. Following this literature-based analysis, the viability of the proposed sustainability-oriented portfolio management process is evaluated through a series of interviews with German property investors. As a result, the study is able to provide detailed practical guidance to corporate leaders for developing and integrating sustainability initiatives into corporate strategies and business activities. Additionally, the sustainability strategies and mechanisms applied by German property investors are investigated for the first time.

This dissertation would not have been possible without the support and encouragement of a large number of people. First, I am very grateful to my supervisors Prof. Dr. Stephan Bone-Winkel and Prof. Dr. Wolfgang Schäfers, who provided me with very valuable advice and excellent guidance. Their ongoing support and constructive feedback was invaluable for the success of my dissertation. During my time at the IREBS Department, they gave me space to grow academically and personally, and their inspirational influence, reaching beyond the scope of my academic work, was truly exceptional.

Second, I would also like to acknowledge the contribution of the interviewees who participated in the study. These leading professional practitioners provided me with an invaluable real-world perspective that was essential to the successful accomplishment of the present study.

Third, my special thanks go to my former colleagues and friends at the IREBS department, namely Manuel Käsbauer, Stefan Gloßner, Ralf Hohenstatt, Andreas Blüml, Alexander Orthmann, Kai Schulte, Konrad Finkenzeller, Tobias Pfeffer, Nicolas Kohl, Johannes Högner and especially Stefanie Forster-Kraus. They contributed to the success of my dissertation in innumerable ways. Not only did I benefit from their constructive comments and valuable discussions, but also from the very welcome distractions they provided along the way.

Most importantly, my most profound gratitude goes to my family. The faith they have had in me and their continuous support throughout the course of my endeavours has been invaluable to me. I would not be where I am today without them. Last, but definitely not least, I wish to thank Andrea Hopfensperger, whose care and love helped me cope with the ups and downs involved in writing this dissertation.

München, February 2012 Helmut Schleich

Table of Contents

List of Figures ..... **VIII**

List of Tables ..... **IX**

List of Abbreviations ..... **X**

1 Introduction **1**

1.1 Motivation for the Study **1**

1.2 Research Questions and Objective of Analysis **4**

1.3 General Theoretical Frame of Reference and Course of Analysis **7**

2 Theoretical and Conceptual Frameworks **11**

2.1 Concepts and Elements of Sustainability and Corporate Social Responsibility **11**

2.2 Fundamentals of Strategic Property Portfolio Management **16**

3 Sustainability in the Real Estate Industry: An Investor's Perspective **24**

3.1 Role of Sustainability in the Real Estate Industry **24**

3.1.1 Sustainability Features in the Real Estate Industry 24

3.1.2 Classification of Sustainability Drivers 29

3.2 Corporate External Sustainability Drivers **32**

3.2.1 Laws and Regulations 32

3.2.2 New Market Standards as a Result of Sustainability Rating Schemes 36

3.2.3 Sustainability Interests of Occupants 45

3.2.4 Sustainability Interests of Shareholders 49

3.2.5 Energy Price Increases and Energy Efficiency Improvements 52

3.3 Corporate-Level Sustainability Drivers **54**

3.3.1 Link between CSR and Competitive Advantage 54

3.3.2 Link between CSR and Corporate Reputation 56

3.3.3 Link between CSR and Risk Management 58

3.4 Expected Effects of Sustainability on Financial Indicators at the Property Level **59**

3.4.1 Effects of Sustainability at the Rental Level 59

3.4.2 Effects of Sustainability on Operating Expenses 63
3.4.3 Effects of Sustainability on Risk 64
3.4.4 Effects of Sustainability on Property Values 65
3.4.5 Effects of Sustainability on Construction Costs 67
3.5 Section Summary 69
4 Conception of a Sustainable Property Portfolio Management Framework 72
4.1 Identification of Sustainability Practices for Property Portfolio Management 73
4.1.1 Proposed Sustainability Schemes in the Academic Literature 73
4.1.2 Sustainability Standards in Third-Party CSR Ratings 80
4.1.3 Sustainability Issues in Property Companies' CSR Reporting 89
4.1.4 Sustainability Standards in Non-Governmental Organizations' CSR Accreditation Schemes 97
4.2 Structure of a Sustainable Property Portfolio Management Process 108
4.3 Barriers to the Adoption of Sustainability Practices in Property Portfolio Management 120
4.3.1 Lack of Tools and Knowledge 120
4.3.2 Economic Obstacles and Lack of Corporate Conviction 122
4.3.3 Barriers in the Leasing Structure 123
4.4 Section Summary 125
5 Strategies and Mechanisms in Sustainable Property Portfolio Management 127
5.1 Strategic and Organizational Aspects of a Sustainable Property Portfolio Management Framework 127
5.1.1 Fundamentals of a Sustainability Policy 127
5.1.1.1 Inception of a Sustainability Policy 127
5.1.1.2 Process of Sustainability Policy Formulation 132
5.1.1.2.1 Corporate Sustainability Materiality Review 132
5.1.1.2.2 Scope and Emphasis of a Sustainability Policy 136
5.1.1.2.3 Sustainability Goals 139
5.1.1.2.4 Sustainability Policy Statement 141

5.1.2 Organizational Structures for Sustainability Policy Execution 142
5.1.2.1 Organizational Structures and Human Resources 142
5.1.2.2 Sustainability Issues in Property Portfolio Risk Management 145
5.2 Sustainability Performance Measurement and Assessment 149
5.2.1 Role and Process of Sustainability Performance Measurement 149
5.2.2 Measurement and Monitoring of Operational Environmental Performance Indicators 152
5.2.3 Evaluation of the Sustainability Performance of Property Design 157
5.3 Sustainability Considerations in the Execution of Investments 160
5.3.1 Consideration of Sustainability in Property Acquisitions and Dispositions 160
5.3.2 Consideration of Sustainability in Property Development 164
5.3.3 Anticipated Effects of Sustainability on Institutional Investors' Portfolios: Theoretical Considerations 167
5.4 Sustainability Issues in Asset and Property Management 171
5.4.1 Sustainability-oriented Tenant Engagement and Green Leases 171
5.4.1.1 Informal Sustainability Approaches in Tenant Engagement 171
5.4.1.2 Formal Sustainability Approaches in Tenant Engagement 173
5.4.2 Sustainable Building Management 177
5.4.2.1 Low-cost Sustainability Approaches in Building Management 177
5.4.2.2 Value-added Sustainability Approaches in Building Management 180
5.4.3 Consideration of Sustainability in the Procurement of Goods and Services 184
5.5 Sustainability Issues in External Corporate Reporting 187
5.5.1 Overview of Sustainability Reporting in the Real Estate Industry 187
5.5.2 Key Elements of a Sustainability Reporting Framework 188
5.6 Section Summary 191
6 Summary and Concluding Remarks 198
Appendix 205
References 235

List of Figures

Figure 1: “House of Real Estate” 8

Figure 2: Summary of contents 10

Figure 3: Proportion of resource use and emissions associated with the “built” environment 24

Figure 4: The circle of blame 28

Figure 5: The framework of sustainability drivers for the real estate investor 31

Figure 6: BREEAM assessment sections and weightings 39

Figure 7: LEED assessment sections and weightings 40

Figure 8: DGNB assessment sections and weightings 42

Figure 9: Comparison of the DGNB, LEED and BREEAM criteria weightings 43

Figure 10: Targeted energy performance levels for certification systems 43

Figure 11: Energy consumption of existing stock versus energy-efficient properties 53

Figure 12: Forecast of energy price increases in Germany in real terms 53

Figure 13: Level of sustainability awareness 123

Figure 14: Integration of sustainability issues into a company’s investment policy 131

Figure 15: Corporate sustainability materiality review 136

Figure 16: Sustainability risk management process 146

Figure 17: Anticipated effects of sustainability on a property portfolio 170

Figure 18: Structure of the proposed sustainable property portfolio management approach 196

List of Tables

Table 1: Portfolio construction techniques 16

Table 2: Potential assessment factors in the strategic property portfolio management model 20

Table 3: Summary of the management activities of a property portfolio management process 23

Table 4: Summary of environmental legislation 32

Table 5: RPI activities identified by Rapson et al. (2007) 74

Table 6: RPI activities identified by Roberts et al. (2007) 75

Table 7: RPI practices identified by Pivo (2008) 77

Table 8: Sustainability assessment criteria used by SAM Group 81

Table 9: Sustainability assessment results of the real estate industry sector (SAM Group) .. 83

Table 10: Assessment criteria used by FTSE Group 85

Table 11: Intangible Value Assessment framework (RiskMetrics) 88

Table 12: UNEP FI Principles for Responsible Investment 98

Table 13: Assessment criteria of the Carbon Disclosure Investor scheme 101

Table 14: Framework of an ISO 14001-based EMS 103

Table 15: GRI Sustainability Reporting Guidelines (G3 Guidelines) 106

Table 16: Structure of a sustainable property portfolio management process 116

Table 17: Summary of the current sustainability measurement and benchmarking tools ... 153

List of Abbreviations

BREEAM	Building Research Establishment Environmental Assessment Method
CBD	Central Business District
CDP	Carbon Disclosure Project
CG	Corporate Governance
CR	Corporate Responsibility
CSR	Corporate Social Responsibility
DGNB	Deutsche Gesellschaft für Nachhaltiges Bauen (German Sustainable Building Council)
DJSI	Dow Jones Sustainability Index
EMS	Environmental Management System
EPBD	Energy Performance of Buildings Directive
EPC	Energy Performance Certificate
ESG	Environmental, Social and Governance
ETS	Emissions Trading Scheme
EU	European Union
GHG	Greenhouse Gas Emissions
GRI	Global Reporting Initiative
HVAC	Heating, Ventilation and Air-Conditioning
ISO	International Organization for Standardization
IVA	Intangible Value Assessment
LEED	Leadership in Energy and Environmental Design
MPT	Modern Portfolio Theory
NGOs	Non-governmental organizations
PRI	Principles for Responsible Investment
RPI	Responsible Property Investment
RICS	Royal Institution of Chartered Surveyors
SRI	Socially Responsible Investment
UNEP FI	UN Environment Program Finance Initiative
WBCSD	World Business Council for Sustainable Development

1 Introduction

1.1 Motivation for the Study

During the past few years, sustainability has been gaining momentum across the business community. Although characterized by controversy and a lack of consensus on definitions, it is frequently described in terms of the so-called triple bottom-line approach. Accordingly, sustainability is seen as balancing economic and social needs with environmental protection.[1]

The built environment and sustainability are closely intertwined. On the one hand, the real estate sector accounts for a large proportion of worldwide energy and resource consumption, as well as carbon dioxide emissions. On the other hand, the sector offers the greatest potential for greenhouse gas abatement and environmental conservation.[2] Both aspects have led to the real estate sector playing a major role in efforts at worldwide environmental protection. Governments are increasingly introducing and tightening legislation regarding buildings and the natural environment, investment fund managers are seeking sustainable indirect property investments and prospective tenants are increasingly looking for sustainable and energy-efficient buildings. These issues induced real estate market participants to improve their understanding of the key role they play in delivering a sustainable economy. The increased attention paid to the sustainability agenda by real estate market participants is reflected, for example, in the occurrence of the term “green building” tripling between 2005 and 2009 in the U.S. popular press.[3] Similarly, the German press reports extensively on sustainability issues in the real estate sector.[4] The growing interest in sustainability is further underpinned by the rapid rise in the number of participants at conferences on green building. For example, the number of exhibitors at the most important German trade fair doubled in 2010, compared to the previous year.[5]

From both societal and building-user perspectives, the benefits of sustainability are clear. Sustainable buildings provide distinct benefits through higher energy efficiency and reduced

[1] Cf. Dixon, T., et al. (2008a), p. 466; Levy, D./Francesco, A. de (2008), p. 5; Lützkendorf, T./Lorenz, D. P. (2005), p. 213; Elkington, J. (1994), p. 99.
[2] Cf. Enkvist, P.-A., et al. (2007), pp. 37 et seqq.
[3] Cf. Eichholtz, P., et al. (April 2010), p. 2.
[4] Cf. Bergius, S. (2010); Hunzicker, C. (2010); Bergius, S. (2009).
[5] Cf. Messe Stuttgart (2010).

environmental impacts.[6] Sustainable buildings not only aid users in reducing cost streams, but also help them create healthier and more productive working environments and better indoor environmental quality.[7] However, the benefits for real estate investors of embracing sustainability have not yet been fully realized. The main obstacle may lie in a lack of corporate knowledge on the consideration of sustainability in property portfolio management.

When focusing on the company, the merging and integration of economic prosperity, social advancement and environmental integrity is encapsulated in the term Corporate Social Responsibility (CSR), leading to a debate on the degree of social responsibility that businesses have toward society.[8] Some scholars argue that companies should strive to maximize profits within the bounds of the law. While this perspective does not exclude considering the interests of parties with a stake in the firm (other than shareholders), it clearly emphasizes a short-term maximization of shareholder value, measured by the share price.[9] By contrast, others believe that firms explicitly need to take account of the interests of various stakeholders, including shareholders. At this juncture, the concept of CSR is perceived as an element of a company's enlightened self-interest, because, by avoiding socially or environmentally detrimental activities, the company supposedly contributes to securing its own long-term economic performance.[10]

Increased corporate attention to CSR evolved after companies had been surprised by adverse effects arising from previously less considered business responsibilities. For example, Shell Oil's plan to dispose the obsolete Brent Spar platform in deep Atlantic waters led to NGOs such as Greenpeace protesting at this corporate behavior and to consumers boycotting Shell.[11] Similarly, Nike was confronted by an extensive consumer boycott after the media reported the abusive labor practices at some of its suppliers.[12] Both incidents demonstrate why corporations inevitably have to take account of environmental and social aspects in their decision-making processes. Neglecting CSR increasingly exerts adverse impacts on a corporation's economic performance, as activist organizations and the media have become

[6] Cf. Mösle, P., et al. (2009), p. 91; World Business Council for Sustainable Development (July 2008), pp. 17 et seqq.
[7] Cf. Miller, N., et al. (2009); Kats, G. (2003), pp. 54 et seqq.; Apte, M. G., et al. (2000); Fisk, W. J./Rosenfeld, A. H. (1997).
[8] Cf. Crane, A., et al. (2008a), pp. 5 et seqq.; Blowfield, M./Murray, A. (2008), pp. 24 et seqq.; Guenster, N., et al. (July 2005), p. 7.
[9] Cf. Friedman, M. (1970).
[10] Cf. Porter, M./Kramer, M. (2006), pp. 3 et seqq.; Garriga, E./Mele, D. (2004), pp. 53 et seqq.
[11] Cf. Sluyterman, K. (2010), p. 205; Porter, M./Kramer, M. (2006), pp. 7 et seqq.
[12] Cf. Locke, R., et al. (July 2006), p. 2.

much more aggressive in influencing consumers and bringing public pressure to bear on corporations. However, corporate responsibilities to society change over time. The use of Asbestos, now accepted as a health risk, was popular in the early 1900s. Firms that failed to foresee the consequences of asbestos being perceived as harmful by various stakeholders faced serious adverse consequences. Such examples clearly show that the companies of today can no longer monitor only the obvious impacts of their business on society and nature. Without a careful process for identifying newly emerging CSR issues, companies may jeopardize their survival.[13] The importance of CSR is further highlighted by organizations that rank companies in terms of their CSR performance or on the environmental impact of their business operations. Although sometimes criticized for their assessment methodology, these rankings draw considerable public attention.[14]

As a result, many companies have launched CSR agendas at a corporate level to address the demands and expectations of a variety of stakeholders.[15] Although some scholars argue that a company's CSR measures may increase business profitability, the academic evidence remains inconclusive.[16] The main reason is the lack of consensus on how to define a sustainable firm. This, in turn, results from the absence of a comprehensive, common framework of generally accepted strategies, tools and measurements for the consideration of CSR in a company's business operations. The prevailing approaches vary considerably and are often criticized for being neither strategic nor operational, but cosmetic. An important argument is that many CSR agendas have been implemented independent of business activity, and are not related to business strategy. For this reason, a strategic CSR framework needs to take account of the sector-specific characteristics and challenges that companies really face.[17]

While there has been little research in the general economic literature on the abovementioned research gaps and contentious issues, a CSR framework explicitly considering the specific characteristics of property investment and management has simply not been on the research agenda.[18] However, the development of a common framework is a necessary condition for integrating sustainability into the strategic and operational management approaches

[13] Cf. Porter, M./Kramer, M. (2006), pp. 7 et seqq.
[14] Cf. Sustainable Asset Management (SAM) Group (2009a), p. 20; Carbon Disclosure Project (2009a), p. 12; See Chapter 4.1.2 for an in-depth discussion of CSR rating schemes.
[15] Cf. KPMG (2009), p. 4.
[16] Cf. Ziegler, A., et al. (2007); Orlitzky, M., et al. (2003); Thomas, A. (2001); Berman, S., et al. (1999); Auckenthaler, C., et al. (Mai 2001); Klassen, R. D./McLaughlin, C. P. (1996); Blacconiere, W. G./Patten, D. M. (1994).
[17] Cf. Porter, M./Kramer, M. (2006), pp. 2–4; Szekely, F./Knirsch, M. (2005), pp. 629 et seqq.
[18] Cf. Jones, P., et al. (2009), pp. 524 et seqq.; Pivo, G. (2009), pp. 483 et seqq.

of property companies, and for assessing the link between sustainability and the financial performance of such companies. In response to anticipated legislation and stakeholder pressure, some property companies, mainly in the U.K. and Australia, have started to implement CSR strategies and mechanisms.[19] Accordingly, a great deal of effort is being directed at reducing energy consumption and CO_2 emissions in the portfolio stock. This underpins the growing importance of climate change issues for the property industry. By actively engaging in sustainability, these companies aim to secure competitive advantages over their rivals and to ensure long-term profitability. However, they continue to provide sustainability information in a manner that is difficult to understand and compare, and as such, does not offer a comprehensive strategic CSR framework.

1.2 Research Questions and Objective of Analysis

In order to address the identified research gap, the present dissertation develops a comprehensive framework that outlines strategies and mechanisms for considering sustainability in property portfolio management. The research focuses purely on the investigation of instruments for "mainstreaming" sustainability in large, existing property portfolios. It does not aim to analyze the development of new dedicated property sustainability funds.[20] In addition, the dissertation scrutinizes the viability of the proposed sustainability framework through a series of interviews with German property investors. The interviews capture the detailed and specific interactions between property companies' regular business operations and sustainability, facilitating the adaption of appropriate sustainability strategies. The dissertation aims at extending the academic literature in two respects. First, the study provides a holistic framework of sustainability strategies and mechanisms that is linked explicitly to the specific characteristics and requirements of property investment and management. In this manner, it provides detailed practical guidance to corporate leaders for developing and integrating sustainability initiatives into corporate strategies and business activities. Second, strategies and mechanisms used by German property investors to consider sustainability are investigated for the first time. Altogether, conducting interviews facilitates the examination of property investment sustainability measures in greater detail than the very limited previous research, which relies exclusively on desktop analysis and questionnaire surveys.

[19] Cf. British Land (2009a); Hammerson (2009); Stockland (2009a); Newell, G. (2008).

[20] Some companies have initiated dedicated property sustainability funds. These are, however, small portfolios of new buildings. The strategies and mechanisms for large portfolios may differ considerably from such approaches.

A broad range of sustainability aspects are relevant to a real estate company's CSR agenda. However, even issues that apply widely in the economy as a whole may have a greater importance for some industry sectors than for others. Property companies are characterized by owning and managing large numbers of assets and having a small, highly paid, well-educated workforce. Consequently, the most critical sustainability issues should be associated directly with a company's investment stock.[21] For this reason, the present dissertation is limited to investigating mechanisms and practices affecting the sustainability of property portfolios. CSR aspects regarding, for example, diversity in hiring, avoiding bribery and reducing the environmental impacts of doing business (e.g., impacts of the corporate car fleet, emissions from a corporation's occupied offices) are excluded from the analysis.

Accordingly, the research questions of this doctoral thesis are as follows:

- Why is the consideration of sustainability issues necessary in general in the real estate industry, and in particular in property portfolio management?
- What sustainability aspects should be incorporated into property portfolio management?
- How can existing property portfolio management approaches used by institutional real estate investors be supplemented by sustainability issues?
- In what form can relevant sustainability aspects be operationalized and implemented in a management system?
- What influence does the increasing importance of sustainability in the real estate industry have on institutional investors' future property portfolio structures?

These research questions, in conjunction with the general lack of research on and knowledge of the strategies and mechanisms for considering sustainability in property portfolio management, suggest the need for a qualitative exploratory research design.[22] Qualitative exploratory research aims to gather preliminary information that enables the identification of problems and causal connections, alongside gaining an in-depth understanding of the behavior and processes involved. Thus, it seeks to answer questions relating to the why and how of the decision-making process. Due to this focus, qualitative exploratory research is particularly well suited for investigating new and under-researched topics.[23] The main purpose of qualitative research is to derive a theory from the data itself and, on this basis, to formu-

[21] For example, in industrialized nations, buildings and their associated construction and operational activities account for 40% of energy use and CO_2 emissions, respectively. See also Chapter 3.1.1.
[22] Cf. Bortz, J./Döring, N. (2006), pp. 351 et seqq.; Maxwell, J. (2009), p. 215.
[23] Cf. Sarantakos/Sotirios (1993), p. 114.

late hypotheses. By contrast, quantitative research is used to test and verify existing hypotheses. In order to develop hypotheses, this dissertation follows an inductive research process that flows from observation to theory to hypothesis and interpretation. Such an approach requires scholars to avoid going into studies with preconceived ideas of prospective research results.[24]

Many techniques are available for collecting and analyzing data in qualitative research. This dissertation relies on guided interviews to gather information on German investors' sustainability strategies and mechanisms, and to ensure the methodological soundness of the proposed sustainability framework. Guided interviews are one form of semi-structured interview. They follow a formalized series of questions to explore a framework of themes, but are flexible, allowing the interviewer to deviate and bring up new questions as needed to pursue worthwhile findings and directions. The interview guide facilitates researcher to focus their interviews on the relevant topics, without constraining them to a particular set of questions.[25] Guided interviews represent a compromise technique that has some of the benefits of both informal and structured interviews. As a result, such interview research provides an opportunity to investigate specific contexts in greater depth than more standardized tools and is thus most valuable when researching new and under-researched topics. Further advantages of interviews are that they allow access to detailed and exclusive expert insight and take account of different levels of knowledge and understanding of the relevant issues. Moreover, they enable researchers to simultaneously examine a broad range of topics.[26] Due to these specific characteristics, guided interviews seem to be the most suitable tool for the research on hand. First, approaches to considering sustainability aspects in property portfolio management have not been overly present in academic research. Second, sustainability and real estate, being interdisciplinary themes, require a consideration of many different issues. Last, ambiguous definitions and different understandings of the term "sustainability" may necessitate clarification prior to detailed inquiries. Against this background, more structured approaches to collecting information (e.g., questionnaire surveys) should be rejected, as they are generally regarded as providing a rather incomplete picture of specific contexts.[27]

[24] Cf. Vandersteop, S./Johnston, D. (2009), p. 168.
[25] Cf. Harrison, M. (2009), pp. 332 et seqq.
[26] Cf. Lindlof, T. (1995), p. 165.
[27] Using more standardized research tools (e.g., survey questionnaires) for investigating new, less frequently analyzed topics can lead to inconclusive results, as respondents are often unable to answer questions meaningfully; for example Li, B. (2003), p. 249.

In order to analyze information from the interviews, the dissertation applies the research technique of content analysis. This methodology is widely used in the social sciences for systematically identifying the properties of recorded transcripts of interviews and making replicable and valid inferences from the data to their specific contexts. This ensures explicitness and consistency so that others can evaluate and replicate the process and qualify the findings as well as ensure the reliability of the instrument.[28]

Altogether, 14 respondents participated in the study. Twelve can be classified as pure property investors, and the remainder are service providers in the field of asset, property and sustainability management. Two of the interviews were conducted by phone. The majority of the respondents were invited to participate in the study because publicly available company documentation had indicated their company's interest in sustainability. The companies had either launched a dedicated sustainability fund[29], published a sustainability report[30], joined a sustainability organization (e.g., German Sustainable Building Council)[31], developed or invested in sustainability-certified buildings,[32] or provided sustainability information on their corporate websites.[33] Consequently, the study is not representative, since the interview sample is biased towards sustainability-oriented companies. Beyond that, a larger interview sample would be required to be able to draw conclusions that are more broadly representative. The interviewed investors differ considerably in terms of investment volume, regional investment focus and quality of property stock. To be able to assess the gathered information in the context of a company's specific business strategy, respondents were asked to indicate the approximate value and allocation of their property investment portfolio as background information. Appendix 1 provides an overview of persons interviewed in the course of the study. The interview questions are listed in Appendix 2.

1.3 General Theoretical Frame of Reference and Course of Analysis

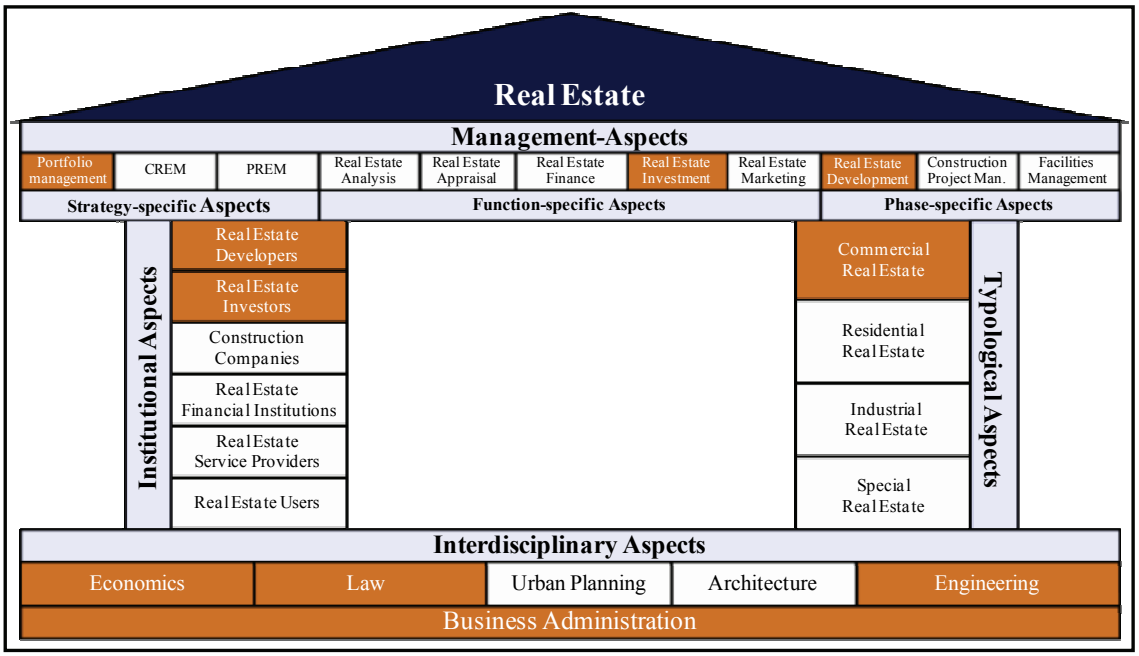
The broader theoretical frame of reference for this dissertation is the subject of real estate as presented in academia. Following Schulte and Schäfers (2005), the study is based on an interdisciplinary approach to real estate, which is best represented by the "House of Real Estate" (see Figure 1). This illustrates how the real estate business involves expertise from diverse fields and, consequently, real estate economics extends beyond a single academic dis-

[28] Cf. Krippendorff, K. (1980), pp. 21 et seqq.
[29] For example, iii-investments.
[30] For example, Pramerica Real Estate International AG and UBS Real Estate KAG.
[31] For example, RREEF, Siemens Real Estate and SEB Asset Management.
[32] For example, DEKA Immobilien Investment, DIC Asset AG and MEAG Munich Ergo Asset Management.
[33] For example, Union Investment Real Estate AG and F&C REIT Asset Management (UK).

cipline. Apart from business administration, which forms the core of real estate studies, economics, law, spatial planning architecture and engineering are of great importance for explaining real-life processes in the property sector.[34]

In developing a comprehensive framework for considering sustainability in the management of property portfolios, the thesis touches upon a variety of elements that are classified in the "House of Real Estate". Because sustainability is the principal subject of investigation and itself an interdisciplinary field of research, it can refer to all of the aspects given in Figure 1. However, analyzing sustainability from the perspective of property investment companies leads to the dissertation relating mainly to business administration, economics and engineering in terms of the interdisciplinary aspects, and to property investors and property developers in terms of the institutional aspects. Emphasizing the perspective of large property investors also enables the study to be limited to commercial real estate, which constitutes the most prominent form of real estate investment. Residential and industrial real estate, constituting only a minor proportion of property investments of the investigated companies, are excluded from the analysis. With regard to the management aspects, portfolio management, real estate investment and property development are considered. Figure 1 pictures the "House of Real Estate" and highlights aspects considered in this dissertation.

Figure 1: "House of Real Estate"



Source: Schulte, K.-W./Schäfers, W. (2005), p. 58.

[34] Cf. Schulte, K.-W./Schäfers, W. (2005), p. 58.

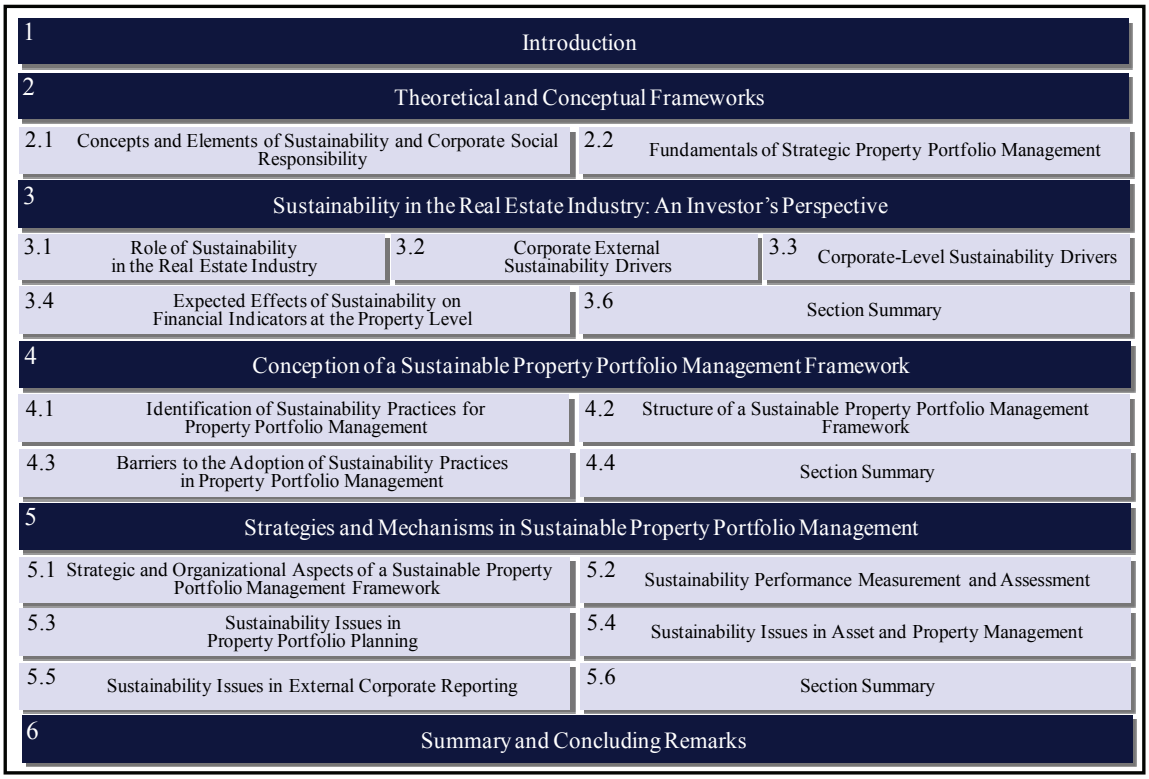
In Chapter 2, the basic theoretical framework provided by the "House of Real Estate" is complemented by the theories of sustainability and strategic property portfolio management. Developing an in-depth understanding of both concepts is an integral part of this dissertation, as they provide the general theoretical framework and structure for the investigation. Using strategic property portfolio management as a conceptual and theoretical foundation ensures that the sustainability strategies and mechanisms to be developed are directly linked to a property company's business strategy and operations.

Chapter 3 starts by illustrating the peculiarities of sustainability in the property sector, which forms the basis for the subsequent analysis of sustainability drivers for property investors. Thereafter, a brief consideration of the impact of the sustainability agenda on the economic performance of buildings is outlined. Gaining a profound understanding of sustainability drivers and the associated impacts on property levels is indispensable for developing an effective sustainable property portfolio management framework.

Having identified sustainability drivers for property companies, Chapter 4 constitutes the beginning of the core of the study. By analyzing various information sources such as academic papers, property companies' CSR reports and rating agencies' sustainability assessment schemes, this chapter identifies mechanisms for integrating sustainability aspects into the management process of property portfolios. On the basis of this investigation, a comprehensive best practice catalogue of strategies and practices for addressing sustainability in the management of property portfolios is proposed.

Subsequently, Chapter 5 tests and ensures the plausibility of strategies and mechanisms suggested in Chapter 4 by investigating their suitability for German property investors through a series of interviews. In addition, interviewing German property investors enables an examination of their activities for addressing sustainability, and for the proposed framework to be supplemented and adapted. Interview questions are based on the best practice catalogue of sustainability strategies and mechanisms developed in Chapter 4. An overview of the study is provided in Figure 2.

Figure 2: Summary of contents



Source: Own illustration.

2 Theoretical and Conceptual Frameworks

This chapter provides definitions and concepts necessary for later analysis. First, the concepts of sustainability and CSR must be described. Due to the at-times ambiguous and misleading applications of these terms, the core characteristics of sustainability and CSR must be clarified in order to understand their relevance for the real estate sector. Second, the process of property portfolio management is explained in order to provide the fundamental frame of reference for the development of a sustainable property portfolio management framework.

2.1 Concepts and Elements of Sustainability and Corporate Social Responsibility

This chapter frames the theories underlying the central investigation undertaken in the present dissertation. The concept of sustainability, constituting the primary theoretical pillar of the study, is a contested construct; it is in practice not possible to provide a definitive answer to the question of what sustainability really is. Numerous definitions have been proposed, with Parkin (2000) referring to more than two hundred.[35] In the general sense, sustainability is seen as a derivation of the concept of sustainable development, which was first outlined by the World Commission on Environment and Development as "…development that meets the needs of the present without compromising the ability of future generations to meet their own needs."[36] Although this report originally only addressed environmental aspects, the concept of sustainable development has expanded into a broader understanding of sustainability as the balancing of economic growth, social advancement and environmental protection.[37] This broader understanding is reflected in, for example, the World Business Council for Sustainable Development (WBCSD) describing sustainability 20 years later as "…the simultaneous pursuit of economic prosperity, environmental quality and social equity."[38]

To a great extent, sustainability draws on and overlaps with theories of corporate social responsibility (CSR), corporate responsibility, corporate social performance, corporate citizenship and corporate sustainability.[39] Among those theories, CSR represents the most im-

[35] Cf. Parkin, S. (2000), pp. 3 et seqq.
[36] Cf. World Commission on Environment and Development (1987), p. 51.
[37] Cf. Garriga, E./Mele, D. (2004), p. 61.
[38] Cf. World Business Council for Sustainable Development (2009).
[39] Cf. Crane, A. et al. (2008a), p. 5; Visser, W. (2007), p. 445; Academic literature discussing and defining the scope of each concept is extensive, see van Marrewijk, M. (2003), p. 95; Wood, D. (1991), p. 692 and will not be reiterated here.

portant concept because the majority of companies, industry organizations and scholars use this term to describe firms' activities in the environmental and social arenas.[40]

Like sustainability, CSR is a cluster concept with strong links to theories of stakeholder management, corporate responsibility and corporate social performance. It has been described and defined by various organizations and academics with similarities and wide variations depending on the institutions and players involved.[41] The resulting ambiguity has led to an increasing number of players arguing that there is no "one size fits all" definition. Instead, CSR is best understood as a custom-made concept that is aligned to a particular organization's overall strategy and takes account of that organization's abilities and limitations in awareness, intent and ambition within its particular industry sector and institutional structure.[42] However, irrespective of the absence of a common definition and differences in the meaning, some core characteristics have evolved. CSR is understood to refer to the integration of social and environmental concerns into a company's business operations in order to optimize the positive effects and minimize the negative effects of a company's actions. At this juncture, companies' CSR-related activities are voluntary in nature and often go beyond legal requirements and duties to shareholders.[43]

Previous analyses of the notions of sustainability and CSR reveal that the concepts are strongly intertwined. As both terms lack clear and unbiased definitions, CSR and sustainability have been used in a broad range of ways, sometimes overlapping and competing.[44] Individual scholars and the EU Commission (2002) also contributed to the confusion of terminology because they used the terms interchangeably.[45] The confusion is further enhanced by differing understandings between geographical regions as well as industry sectors. In particular in the private sector, public use of these terms depends heavily on geographical origin and industry sector.[46] Consequently, sustainability and CSR cannot be described as objective or neutral concepts but rather must be called normative and subjective topics. Therefore, they always contain a specific set of implicit and explicit values.[47] In this disser-

[40] Cf. {KPMG 2009 #271}{Szekely 2005 #323 et seqq}.
[41] Cf. Crane, A. et al. (2008a), pp. 5 et seqq.; Carroll, A. (1999), pp. 268 et seqq.
[42] Cf. Garriga, E./Mele, D. (2004), p. 62; van Marrewijk, M./Werre, M. (2003), p. 107.
[43] Cf. Dahlsrud, A. (2008), p. 6; World Business Council for Sustainable Development (1999), p. 5; Carroll, A. (1999), p. 268.
[44] Cf. Rottke, N. B./Reichardt, A. (2009), p. 30; Crane, A. et al. (2008a), p. 5; Wan-Jan, W. S. (2006), p. 177; van Marrewijk, M. (2003), p. 96.
[45] Cf. Edgerton, N. (2007); van Marrewijk, M. (2003), p. 102; EU Commission (2002).
[46] Cf. Crane, A. et al. (2008a), pp. 6, 11, 57.
[47] Cf. Visser, W. (2007), p. 446.

tation, sustainability is seen as a macro-level framework of merging economic, environmental and social issues. CSR is understood to describe the pursuit of sustainability principles on a corporate level.[48]

Sustainability and CSR have gained increasing momentum across the business community during the past decade, as evidenced both in published usage of the terms and in real policy initiatives based on them. Companies' growing interest has been triggered by environmental pollution and disasters, tightening governmental legislation, increasing customer and investor awareness and the economic downturn due to corporate irresponsibility.[49] However, in spite of an increasingly greater acceptance of the CSR agenda, there is still controversy over whether or to what degree managers should adhere to CSR principles during their strategic decision-making processes. In other words, debate exists over whether a company should be managed to solely pursue the interests of its owner(s) or the interests of a wider group of stakeholders beyond (but including) its shareholders.[50] This has often been rephrased as the question of "can a firm do well while doing good?" As a result of this debate, a great deal of academic research in the field of CSR is dedicated to examining a company's CSR performance versus its financial performance. Skeptics, including Henderson (2001) and Walley and Whitehead (1994), have declared CSR and sustainability to be vague constructs that require corporations to raise operating costs and invest in projects with little payoff.[51] The costs associated with improving a firm's CSR performance are, according to these scholars, likely to outweigh the economic advantages. In contrast, other academics have said that pursuing CSR initiatives in companies can lead to improvements in investor relations, efficient use of resources and reputational advantages, all of which can contribute to superior financial performance.[52]

Empirical academic work analyzing the CSR-financial performance link is limited and results are inconclusive. The existing literature is separated into three subsets: event studies, cross-sectional regression analyses and portfolio studies.[53] Event studies examine the direct

[48] Following this differentiation, in this dissertation the term "CSR" is used for aspects relating to portfolio-level sustainability issues. The term "sustainability" applies to environmental and social issues outside the portfolio level, e. g., sustainability issues at the property level.
[49] Cf. Sustainable Asset Management (SAM) Group (2009a), p. 14; KPMG (2009), p. 18; Blowfield, M./Murray, A. (2008), p. 12; Rauschenberger, R. (2002), pp. 26 et seqq.
[50] Cf. Garriga, E./Mele, D. (2004), pp. 53–55; Mintzberg, H. (1983), pp. 4 et seqq.; Friedman, M. (1970).
[51] Cf. Henderson, D. (2001), p. 28; Walley, N./Whitehead, B. (1994), p. 49.
[52] Cf. Porter, M./Kramer, M. (2006), pp. 82, 91; Guenster, N. et al. (July 2005), pp. 5; Fombrun, C. et al. (2000), pp. 85 et seqq.; Russo, M. V./Fouts, P. A. (1997), pp. 537–540; Mintzberg, H. (1983), pp. 4 et seqq.
[53] Cf. Guenster, N. et al. (July 2005); Rauschenberger, R. (2002), pp. 84 et seqq.

impacts of social or environmental events (e.g., environmental catastrophes such as the Exxon Valdez oil spill, positive environmental information such as ISO 140001 certification or bad publicity for social policies such as abusive employment practices) on short-term stock prices. Results by Auckenthaler et al. (2001), Klassen and McLaughlin (1996), White (1996) and Blacconiere and Patten (1994) all indicate an influence of environmental news on stock prices.[54] Regression analysis surveys the long-term relationship between CSR performance and stock returns. These studies have provided mixed support for CSR activities' influence on stock performance. In particular, early studies failed to confirm any impact of environmental performance on stock performance. More recent analyses, including those of Ziegler (2002), Thomas (2001) and Berman et al. (1999), however, provide modest evidence of a positive link.[55] Portfolio research is generally based upon a comparison of average risk-adjusted returns between mutually exclusive portfolios using CSR performance as a discerning factor. Again, results have been diverse. Cohen et al. (1997) and Freedman and Jaggi (1988) found no positive implications of CSR performance on portfolio returns.[56] On the contrary, Guenster et al. (2005), Dowell (2000) and Waddock and Graves (1997) detected either superior performance by sustainability leaders or underperformance by sustainability laggards.[57]

Results of these regression and portfolio research studies have to be interpreted with caution because authors relied on different indicators to measure CSR performance. For example, Guenster et al. (2005) used the assessment results of the Innovest Strategic Advisors' corporate sustainability rating, while Berman et al. (1999) used indicators from the KLD Index. Cohen et al. (1997) examined quantities and contexts of environment-related lawsuits, penalties and levels of dangerous emissions.

Apart from leading to the aforementioned results being incomparable, different approaches to measurement of CSR in these studies highlight the need for an overall acknowledged CSR criteria framework.[58] The failure of current research to reach a consensus on which particular responsibilities belong to which companies and what may constitute relevant mechanisms and tools for managing CSR represents a major problem for researchers of the

[54] Cf. Auckenthaler, C. et al. (Mai 2001); Klassen, R. D./McLaughlin, C. P. (1996); Blacconiere, W. G./Patten, D. M. (1994).
[55] Cf. Ziegler, A. et al. (2007); Thomas, A. (2001); Berman, S. et al. (1999).
[56] Cf. Cohen, M. A. et al. (May 1997); Freedman, M./Jaggi, B. (1988), p. 50.
[57] Cf. Guenster, N. et al. (July 2005); Dowell, G. et al. (2000); Waddock, S./Graves, S. (1997).
[58] Cf. Guenster, N. et al. (July 2005), p. 5.

CSR-financial performance link, and as a result, problems arise in the introduction of CSR management approaches in the real world.[59] For this reason, several authors have called for the development of a comprehensive CSR framework that allows corporations to identify their core CSR issues. However, this framework is still in its infancy. Szekely and Knirsch (2005), having studied approaches used by European corporations across several business sectors to measure their social and environmental performance, concluded that "the assessment of environmental performance is still very limited. Management of the social sustainability dimension is even less advanced."[60] Furthermore, although they did not consider the property sector in particular, Pivo (2009) and Jones et al. (2009) argued that the same conclusions apply to the real estate sector.[61] Proposals outlining a CSR management approach have been published by, Xie and Hayase (2007), Brown and Fraser (2006) and Szekely and Knirsch (2005), among others, though none of these cases focused on the real estate industry.[62] In addition to fueling academic work, sustainability ratings developed by financial advisory companies have gained increasing importance and provide additional guidance for defining a sustainability-oriented company.[63] Irrespective of recent research efforts, the evolution of a consensus standard for CSR has been prevented by the very limited amount of academic research, the varying emphasis of published studies and the ever-changing CSR landscape.

This chapter shows that the CSR concept is dynamic, diverse and context-specific. As a result, the consideration of CSR issues in a company's business operations necessitates custom-tailored strategies and mechanisms to tackle the specific sustainability challenges that a company really faces. Only then will a company's CSR management approach provide economic benefits and mitigate risks. In addition, the development of a widely accepted, sector-specific CSR framework represents a prerequisite for serious comparative research on the relationship between CSR performance and corporate financial performance. There is currently no such CSR framework that explicitly accounts for the peculiarities of the real estate investment and management sector. This dissertation aims to address the research gap in CSR and real estate literature by identifying sustainability strategies and mechanisms for application in property portfolio management.

[59] Cf. Sarasin Bank AG (August 2007), p. 5; Guenster, N. et al. (July 2005), p. 7.
[60] Cf. Szekely, F./Knirsch, M. (2005), p. 645.
[61] Cf. Jones, P. et al. (2009), pp. 524 et seqq.; Pivo, G. (2009), pp. 483 et seqq.
[62] Cf. Xie, S./Hayase, K. (2007); Brown, J./Fraser, M. (2006); Szekely, F./Knirsch, M. (2005).
[63] The most important sustainability ratings are discussed in greater detail in Chapter 4.

2.2 Fundamentals of Strategic Property Portfolio Management

Aside from examining theories of sustainability and CSR, the present study draws on the fundamentals of strategic portfolio management to form the second pillar of the theoretical framework. Portfolio management as a field involves the composition and management of a multitude of various assets.[64] Discussing property portfolio management requires categorizing investment, portfolio and property levels.[65] The investment category deals with the planning of capital allocations within broad multi-asset portfolios. Capital allocation within individual asset classes is surveyed at the portfolio category. At this juncture, property portfolio management addresses all aspects related to the aggregated property stock.[66] The property category addresses the management of individual properties and in real estate literature and practice is often referred to as asset management.[67] The research focus of this dissertation is directed at the portfolio category. Therefore, the investment and property level are excluded from further consideration.

The first step in constructing a new portfolio or repositioning an existing portfolio is to identify the portfolio investors' preferences, objectives and constraints.[68] Understanding investor needs forms the foundation for developing a formal investment policy that is aligned to investor objectives and constraints. Portfolio objectives often pertain to the trade-off of risk, return and liquidity. Further considerations impacting the development of an investment policy are, for example, the size of the portfolio, the sophistication of the investor, the human resources available, previous investment strategies and the current investment environment.[69] Finally, on the basis of the investment policy, the portfolio management process has to define the investment approach to best accomplish an investor's goals and objectives.[70] At this juncture, it is necessary to specify a methodology for the portfolio construction process. Available techniques can be classified into quantitative and strategic/qualitative portfolio approaches, as shown in Table 1.[71]

Table 1: Portfolio construction techniques

Quantitative approaches to portfolio construction	Strategic approaches to portfolio construction
Modern portfolio theory (MPT)	Learning curve effects model

[64] Cf. Bruns, C./Meyer-Bullerdiek, F. (2008), p. 93.
[65] Cf. Bone-Winkel, S. et al. (2005), pp. 777 et seqq.; Gesellschaft für Immobilienwirtschaftliche Forschung e.V. (2004), pp. 3 et seqq.
[66] Cf. Schulte, K.-W. et al. (2007), p. 28.
[67] Cf. Geltner, D. et al. (2007), p. 524.
[68] Cf. Wüstefeld, H. (2007), p. 69; McMahan, J. (2006), p. 76; Pyhrr, S. A. et al. (1989), p. 91.
[69] Cf. Bruns, C./Meyer-Bullerdiek, F. (2008), p. 3; Rottke, N. B./Schlump, P. (2007), p. 41.
[70] Cf. Mueller, G. R./Louargand, M. A. (1995), pp. 967 et seqq.
[71] Cf. Wellner, K. (2003), p. 158.

Capital asset pricing model (CAPM)	Profit impact of market strategies (PIMS)
Sharpe model	BCG matrix (Growth-share matrix)
Arbitrage pricing theory	McKinsey matrix (Market attractiveness-competitive advantage matrix)
Downside-risk approaches	
Black-Litterman model	

Source: Compilation based on Estrada, J. (2006), p. 57 et seqq.; Wellner, K. (2003), p. 158-159; Geltner, D. et al. (2007), pp. 524 et seqq.; Nawrocki, D. (1999), pp. 9 et seqq.; Rom, B./Ferguson, K. (1993), pp. 28 et seqq.; Black, F./Litterman, R. (1992), pp. 28 et seqq.

These techniques are not mutually exclusive. All of them, or a combination of them, can be used for portfolio construction at the same time. For decades, in real estate practice and in academia, an asset-by-asset approach has dominated the assembling of a property portfolio. Using this approach, investment decisions are based solely on the individual property's fundamentals (e.g., NPV maximization, location, physical and economic characteristics) and do not consider the influence of the risk-return profile of an individual property on the risk-return profile of the entire portfolio. Over the past two decades, real estate investors and academics have increasingly begun to include comprehensive portfolio considerations in their decision making in order to understand asset interdependencies and the influence of an individual property on the portfolio, in addition to the analysis of specific fundamental building attributes.[72] In light of this trend, portfolio composition has often come to be viewed in the context of mean-variance portfolio theory (modern portfolio theory).[73]

Modern portfolio theory (MPT) focuses on finding the optimum asset allocation within a portfolio, and thus determining the most "efficient" portfolios out of a set of possible ones.[74] Using this approach, the objective of the macro-level investment decision maker is to minimize a portfolio's volatility (or variance) with the anticipation of a certain return, or to achieve the highest level of return in exchange for a given amount of risk.[75] Risk-averse investors will always prefer optimized risk-return combinations of assets, which results in efficient portfolios dominating inefficient ones. The set of all possible efficient portfolios ("the efficient frontier") can be determined by mean-variance portfolio optimization. This mathematical process requires that several assumptions be fulfilled in order to make accurate portfolio allocations. These assumptions include normally distributed asset returns, constant correlations between assets, the absence of transaction costs and taxes and the validity of the efficient markets hypothesis.[76] By defining investment risk in quantitative terms, the

[72] Cf. Lieblich, F. (1995), pp. 999 et seqq.
[73] Cf. Eichholtz, P./Hoesli, M. (1995); Miles, M./McCue, T. (1982).
[74] Cf. Markowitz, H. (1952), p. 77-91.
[75] Cf. Geltner, D. et al. (2007), p. 529.
[76] Cf. Markowitz, H. (1952), p. 77-91.

traditional MPT laid the foundation for the establishment of a formal framework for investment decision making. This framework, however, also has a number of serious theoretical weaknesses, which have led academics to improve and modify the asset allocation optimization process. First, the application of MPT is limited when asset returns are skewed. Second, the MPT definition of risk does not correspond to investors' actual perception of risk. Investors generally associate risk with returns that are below their expectations, and they do not associate risk with positive returns that exceed their expectations. MPT, however, treats deviations from the mean in the same way, regardless of whether they are positive or negative. Post-modern portfolio theories particularly address two specific drawbacks of MPT. In portfolio practice as well as in academia, the downside risk framework is widely seen as the most appropriate approach to address these weaknesses of the MPT, and to determine portfolio allocations that adequately reflect investors' preferences of risk.[77] According to Estrada (2006), the downside risk of an asset can be described by its semivariance with respect to a specified target return.[78] To ascertain the optimal asset weights within a portfolio makes it necessary to minimize the semivariance, which constitutes the portfolio risk. Because the downside risk approach focuses only on the risks below a given target return, it represents an appealing alternative to MPT.

The abovementioned quantitative approaches are widely used for the optimization of multi-asset portfolios, while their application within real estate portfolios is highly controversial. Proponents of these approaches suggest that they could be applied in order to ascertain the optimal diversification into different property types, such as office, retail or industrial, or into different regions.[79] However, problems are encountered in this type of use. First, future returns will not necessarily match past performance. Evidence is emerging that historical return and risk may be poor indicators of future performance and do not provide helpful guidance for current management decisions.[80] Past performance data may, at best, be a starting point for projecting the future performance of properties.[81] Clearly, rigorous application of quantitative portfolio models within real estate portfolios requires highly refined yet reliable risk and return expectations by property segment. This kind of data, however, is nonexistent in the real estate industry.[82] Second, a key tenet of all quantitative portfolio theories is that they are developed in order to optimize the risk-return profile of the entire portfolio ra-

[77] Cf. Sing, T.F./Ong, S.E. (2000), pp. 213-214; Rom, B./Ferguson, K. (1993), pp. 28 et seqq.; Harlow, W. (1991), pp. 28-29.
[78] Cf. Estrada, J. (2006), pp. 57 et seqq.
[79] Cf. Geltner, D. et al. (2007), p. 543.
[80] Cf. Jackson, C./Orr, A. (November 2008), p. 4.
[81] Cf. Pagliari, J. L./Webb, J. R. (1995), p. 1061.
[82] Cf. French, N. (2001), pp. 402 et seqq.

ther than specific asset classes of the portfolio in isolation from one another. For example, an individual property segment has little correlation with other property segments, but it has a high correlation with stocks and bonds. Accordingly, the optimization of the real estate portfolio may assign considerable weight to this property segment. From the perspective of the overall portfolio, though, including stocks and bonds, an investment in this property segment would be less beneficial.[83] Generally speaking, there is little conceptual knowledge regarding the use of quantitative portfolio models within real estate portfolios. Accordingly, an overly high degree of reliance on quantitative "top-down" approaches in portfolio assembly is not considered appropriate in the real estate sector.[84] In addition to these theoretical and practical complications that attend mathematical approaches to asset selection in real estate portfolios, real estate professionals emphasize the overriding importance of analyzing the fundamentals of individual property investments. For these reasons, the rigorous use of quantitative portfolio approaches within real estate portfolios has not gained widespread acceptance in real estate practice or in academia, either. However, risk-return profiles of large institutional investment portfolios may benefit from less formal, common-sense-based diversification. An intuitive approach to portfolio theory suggests that the inclusion of property types whose underlying economic foundations (e.g., tenants and economic regions) are subject to different economic cycles contributes to the reduction of portfolio risk.[85] Therefore, an effective process of portfolio composition must take into account both a property's ability to compete in future markets (including an assessment of underlying return-generating property attributes such as location, use and flexibility) and the influence of an individual property on the risk-return profile of the entire portfolio. This approach will give emphasis to qualitative as well as quantitative aspects.

To advance property portfolio management beyond the principles of pure quantitative portfolio theories, Bone-Winkel (1994) and Wellner (2003) suggested a transfer of focus from strategic management to the determination of optimum property portfolio allocation.[86] Their work is based on the assumption that the future value of a property portfolio and the competitive position of a property company cannot be known based only upon past risk and performance alone. The authors advocate the adoption of the basic analytical framework of a market attractiveness/competitive advantage portfolio model. In this model, the market attractiveness and competitive position of each building in a portfolio are assessed on the basis

[83] Cf. Geltner, D. et al. (2007), p. 529.
[84] Cf. Rahman, T./Havard, T. (1997), pp. 4 et seqq.
[85] Cf. Geltner, D. et al. (2007), p. 543.
[86] Cf. Bone-Winkel, S. (1994); Wellner, K. (2003).

of a property's specific attributes. The assessment of these two qualities requires the identification and inclusion of the property attributes that most influence a property's future value.[87] This model can be classified as a "bottom-up" approach, since it takes the assessment of individual properties into account. Table 2 provides an overview of the property assessment criteria suggested by Bone-Winkel (1993).

Table 2: Potential assessment factors in the strategic property portfolio management model

Market Attractiveness	Relative Competitive Advantages
Economic and political situation	Use concept and feasibility
Demographic/socio-economic factors	Tenant mix
Infrastructure	Site-related factors
Soft factors	Architecture/technical design
Structure and development of available property	Property management, investment and operating costs
Structure and development of property demand	Yield
Yield and price levels of local market segment	Potential increase/decrease in value

Source: Bone-Winkel, S. (1994), p. 52.

The selection and weighting of criteria and possible sub-categories are dynamic and should be altered as user requirements and the market's perception of property attributes change over time. The final scores of the assessment show the positions of individual properties in the portfolio. In a diversified portfolio, individual properties with similar building characteristics (e.g., type, region) can be aggregated into strategic business units. By so doing, it becomes possible to outline a comprehensive portfolio model that takes into account individual property attributes as well as the interdependencies of properties within the portfolio.[88]

The identification of the actual market positions of all the properties and strategic business units in a portfolio allows for the development of a comprehensive conceptual perspective on property portfolio management. This perspective provides the basis for the determination of strategic measures to improve the positioning of properties, strategic business units and the portfolio as a whole. Emerging shortcomings in a portfolio can then be identified and addressed at an early stage to ensure that the portfolio objectives are achieved. In accordance with Bone-Winkel (1994), Pagliari (1995) argued that the greatest contributions of a strategic asset allocation approach are its attempt to identify major market movements and the

[87] Cf. Allendorf, G. J./Kurzrock, B.-M. (2007), pp. 122 et seqq.; Bone-Winkel, S. (1994), pp. 51–52.
[88] Cf. Bone-Winkel, S. et al. (2005), p. 810; Wellner, K. (2003); Bone-Winkel, S. (1994).

support it offers in controlling and coordinating property-related activities in property portfolio management.[89]

As a result of the abovementioned shortcomings of quantitative asset allocation approaches to the assembly of real estate portfolios, and the benefits of qualitative approaches, this dissertation draws upon the concept of strategic property portfolio management as a basis for research. In the real estate industry, sustainability represents a fairly new and under-researched topic with doubtless unknown impacts on future risk and opportunity (expected performance).[90] A strategic property portfolio management approach enables to holistically investigate the influence of the sustainability agenda on property investment companies. In particular, it allows for the consideration of changing market requirements, and thus indicates sustainability-related opportunities and risks at the property and portfolio level. In addition, a strategic property portfolio management approach provides a framework with which one can get an overview of the potential effects that a property company's sustainability strategies and sustainability management capabilities have on its property portfolio. Therefore, the strategic property portfolio management model is best suited to serve as the theoretical framework for this dissertation.

The strategic property portfolio model represents the methodological basis for the determination of a target portfolio's allocation.[91] Its translation into a workable business management approach in real estate practice requires the implementation of a holistic management process that enables companies to accomplish their portfolio objectives.[92] This process needs to include sub-strategies for each functional portfolio discipline, including acquisition, property development, asset and property management, and property disposition; ultimately, these sub-strategies will determine the specific requirements for property selection and for the management of properties.[93] An example of this is that the acquisition and property development strategy must define certain standards for prospective investments, such as specifications regarding property age, building quality (e.g., quality of the building's envelope and HVAC appliances), and location (e.g., regional investment emphases or micro-level aspects, such as proximity to public transportation). Likewise, the disposition strategy has to

[89] Cf. Pagliari, J. L./Webb, J. R. (1995), p. 1061.
[90] Because sustainability represents a new issue in the real estate sector, it is impossible to quantify ex ante the influence of the sustainability agenda on the expected risk and return of property investments.
[91] Cf. Pyhrr, S. A. et al. (1989), pp. 97 et seqq.
[92] Cf. Wüstefeld, H. (2007), pp. 81 et seqq.
[93] Potential strategic measures for each functional portfolio discipline are discussed in greater depth in Chapters 4 and 5.

determine indicators for the selection of properties that no longer fit the portfolio. The asset and property management strategy must outline policies and objectives concerning the actual operations of portfolio properties. These can then serve as guidelines for the adoption of strategic measures to manage issues such as a company's leasing and tenant engagement activities (e.g., coordination of cooperative efforts with real estate brokers, the analysis of rental markets, and the conducting of tenant satisfaction surveys). Moreover, an asset and property management strategy must outline a company's day-to-day building management practices, including building maintenance (e.g., the planning of investment in energy efficiency upgrades) and building operations (e.g., waste management policy and monitoring policy to ensure that the building and its equipment are performing at optimum levels). Beyond this, companies must define strategies for their collaboration with external service providers (e.g., facility management contractors). Relevant issues in this regard include, for example, the approach for selecting contractors, the definition of the responsibilities and duties of contractors, and associated fee arrangements (e.g., performance fees).[94]

Asset portfolios compete in a continually changing external environment. Thus, the perception and assessment of portfolio assets may change over time as market standards evolve and as properties appreciate or depreciate. The portfolio management process must be able to flexibly respond to new developments so that effective portfolio management strategies can be adopted. This requires a range of supplementary management activities in the portfolio management process. First, regular inventories and analyses of the existing portfolio stock are necessary. Second, the performance of individual properties and of the entire portfolio must be monitored on an ongoing basis. Third, risk management forms a fundamental part of the portfolio management process, as it allows for the timely identification of risks and the adoption of mitigation strategies. Fourth, there must be reporting of the portfolio performance and portfolio policy, so that external investors can determine if their investment is still in line with their objectives; this reporting therefore constitutes an essential element of the portfolio management process.[95] Other initiatives, such as infrastructure development in the form of human resources and technological systems management, must also be pursued in addition to these portfolio management activities. The following table summarizes the management activities of the portfolio management process that are required in order to translate the strategic property portfolio management model into a workable business management approach.

[94] Cf. Lieblich, F. (1995), pp. 1045 et seqq.
[95] Cf. Brown, G./Matysiak, G. A. (2006), p. 496; Gesellschaft für Immobilienwirtschaftliche Forschung e.V. (2004), p. 16; Walbröhl, V. (2001), p. 71.

Table 3: Summary of the management activities of a property portfolio management process

Portfolio management process	Management activities
1. Portfolio policy	➢ Determination of objectives and constraints of investors ➢ Definition of an overall investment philosophy and portfolio policy ➢ Determination of portfolio objectives and targets ➢ Determination of decision criteria and methodology for the portfolio construction process ➢ Determination of a target portfolio
2. Internal governance	➢ Provision of human resources to realize and transpose portfolio policy
3. Inventory & monitoring	➢ Identification and measurement of indicators that affect portfolio risk and performance ➢ Ongoing target-performance comparison ➢ Performance benchmark with competitors ➢ Definition of property valuation framework
4. Risk management	➢ Implementation of a risk management process to identify, assess and control risks
5. Determination of strategies for portfolio planning	➢ Determination and implementation of a strategy for property acquisition, retention and disposition ➢ Determination and implementation of a property development strategy
6. Portfolio strategies for asset and property management	➢ Determination and implementation of a strategy to organize asset management and property management ➢ Development of a strategy for managing service providers
7. Reporting	➢ Definition of an external reporting framework ➢ Realization of external auditing

Source: Own illustration following Gesellschaft für Immobilienwirtschaftliche Forschung e.V. (2004) and Lieblich, F. (1995), p. 1005.

The overall objective of this dissertation, as stated in the research questions, is to devise a comprehensive property portfolio management framework that allows for the analysis of sustainability-related activities. Illustrating the influence of the increasing importance of sustainability on property investment companies requires analysis of the activities of the portfolio management process, as shown in Table 3. Through this approach, the research presented here aims to identify the specific portfolio management activities that must be adapted in order to effectively consider sustainability in property portfolio management. Identifying and understanding these activities is prerequisite to the development of workable sustainability strategies and mechanisms.

3 Sustainability in the Real Estate Industry: An Investor's Perspective

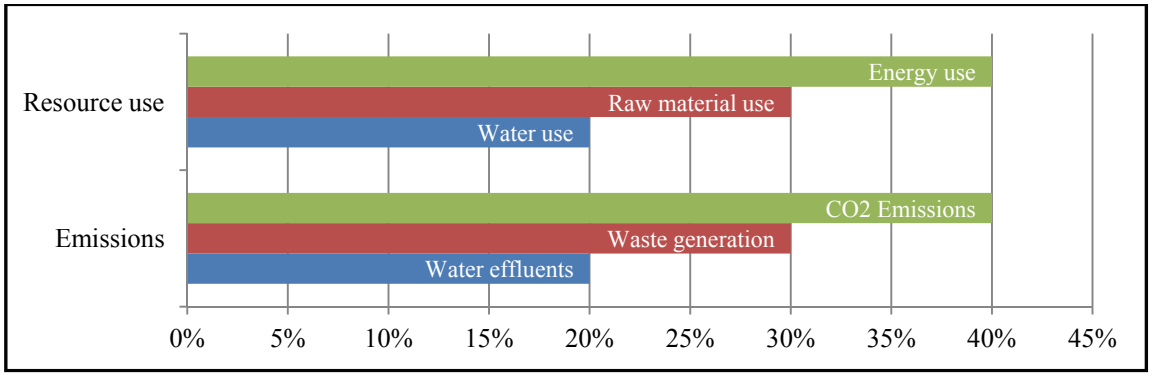
The previous chapter reveals that the meaning and characteristics of sustainability and CSR vary from sector to sector. Therefore, in the following sections, both concepts are analyzed in a property-specific context. In particular, the focus is on evaluating sustainability and determining sustainability drivers in the real estate industry. Finally, implications of the sustainability agenda on the financial performance of properties are analyzed.

3.1 Role of Sustainability in the Real Estate Industry

3.1.1 Sustainability Features in the Real Estate Industry

In the property industry, sustainability and CSR have attracted intensified attention only recently, as a wider audience has become aware of the increasing role of real estate in the protection of the natural environment. In industrialized nations, buildings and their associated construction and operational activities (the "built" environment) account for a significant proportion of resource use and emissions (Figure 3).[96]

Figure 3: Proportion of resource use and emissions associated with the "built" environment



Source: UNEP Sustainable Buildings & Construction Initiative (2009), p. 8; UNEP Sustainable Buildings & Construction Initiative (2008), p. 4.

Recent studies have indicated that measures related to the property stock, such as improving insulation, optimizing building management and installing modern lighting technology, can contribute significantly to greenhouse gas abatement. The majority of these measures provide substantial financial benefits for property investors.[97] These potential benefits, along with the increased environmental awareness of society and the government, have prompted

[96] Cf. UNEP Sustainable Buildings & Construction Initiative (2009), pp. 8 et seqq.; UNEP Sustainable Buildings & Construction Initiative (2008), pp. 4 et seqq.
[97] Cf. Stern, N. (2008); Levine, M./Ürge-Vorsatz, D. (2007), p. 409; Enkvist, P.-A. et al. (2007), pp. 37 et seqq.

real estate market participants to understand their role in delivering a sustainable economy. Several studies, such as those by Deutsche Gesellschaft für Immobilienfonds (2009), Dixon et al. (2008), Myers et al. (2008), Cushman & Wakefield (2007) and Sayce et al. (2007), have detailed the increased importance of sustainability in the property industry by showing that the majority of real estate practitioners regard sustainability as either important or very important.[98] The only study that has focused on the German property market was conducted by Deutsche Gesellschaft für Immobilienfonds (2009). Results from their survey indicate that the attention paid to sustainability has increased; 38% and 43% of respondents agreed completely or partially, respectively, that sustainability is an important component of their companies' business strategy.[99] The research of Dixon et al. (2008) is also illuminating. These authors analyzed the degree to which real estate practitioners were engaged with the sustainability agenda by distributing online questionnaires to 47,000 members of the Royal Institution of Chartered Surveyors (RICS). The findings of the survey show that of the 4,600 respondents, 60% considered sustainability to be "totally" or "substantially" relevant.[100] In general, all studies researching sustainability in the real estate industry have reported that it has become a top priority. However, these surveys may be biased because market participants want to be perceived as good corporate citizens who are mindful of current developments. Although their responses may indicate a concern for sustainability, their business actions may not.

Irrespective of intensified concern, sustainability in the real estate context is ill defined.[101] Dixon et al. (2008) identified energy supply (59%), land contamination (43%), transport (36%) and waste management (34%) as the most important sustainability issues for RICS members. Other criteria included climate change, natural resources, flooding, air and water pollution, water supply, social exclusion and biodiversity loss.[102] This result underscores the notion that many people limit the scope of the term "sustainability" to environmental issues. In this context, green buildings have often been used to describe sustainability. Thus, sustainability has been understood mainly from an environmental perspective, while social and economic perspectives have been neglected. Green buildings are environmentally responsible and resource-efficient properties throughout their life cycle, which includes design, construction, operation, maintenance, renovation and deconstruction. This practice expands and

[98] Cf. DEGI Deutsche Gesellschaft für Immobilienfonds (September 2009); Dixon, T. et al. (2008a), p. 466; Myers, G. et al. (2008), p. 310; Cushman & Wakefield (2007), p. 11; Sayce, S. et al. (2007), p. 637.
[99] Cf. DEGI Deutsche Gesellschaft für Immobilienfonds (September 2009), p. 6.
[100] Cf. Dixon, T. et al. (2008a), p. 466.
[101] Cf. Kimmet, P. (2009), p. 470; Keeping, M. (2000), p. 4.
[102] Cf. Dixon, T. et al. (2008a), p. 468.

complements the classical design concerns of economy, utility, durability and comfort.[103] Resource consumption and pollution are at the core of this new design perspective. In addition to this widely applicable definition, green buildings are associated with environmental performance specifications that exceed minimum legal requirements.[104] Based on the three dimensions of sustainability, the term "sustainable building" must be defined more holistically. Beyond protecting and preserving the natural environment, natural resources and capital and material goods, properties classified as sustainable must protect and promote human health and well-being, social values and public goods.[105] Regardless of these definitions, a consensus on the specific design features and building characteristics of a green or sustainable building has not been reached. Presently, green building certification programs administered by green building councils provide widely accepted standards. However, the multitude of certification programs has prevented the establishment of a common understanding. For example, in Germany, the BREEAM (Building Research Establishment Environmental Assessment Method), LEED (Leadership in Energy and Environmental Design), EU Green Building and DGNB (German Sustainable Building Council) ratings are used. In addition to these certification programs, academics, such as Ellison and Sayce (2007) and Lützkendorf and Lorenz (2005), have conducted research to determine sustainable building design features. Ellison and Sayce (2007) published a set of sustainability criteria that are regarded as relevant to the operational and investment performances of properties. Possible criteria were drawn from the literature and ranked in focus groups and interviews. The most important criteria, in order of decreasing importance, were accessibility, building adaptability, pollutants, contextual fit, energy efficiency, occupant satisfaction, occupant behavior and building use, waste management and water consumption.[106] Lützkendorf and Lorenz (2005) derived a set of possible sustainability criteria from the literature but did not rank them. Their set of criteria includes a range of environmental sustainability issues (energy use, raw material depletion, land use, impacts on the environment, waste production and impacts on soil and ground water), considers economic sustainability criteria (life cycle costs, development of income, value and worth) and covers social aspects (health of occupants, comfort and well-being of occupants, safety of occupants, indoor air quality, comfort and well-being of neighbors and cultural value).[107] In addition to academic research, property consultancy companies regularly investigate property attributes regarded as relevant for sustainable buildings by real estate practitioners. After surveying leading U.K. property investors, GVA

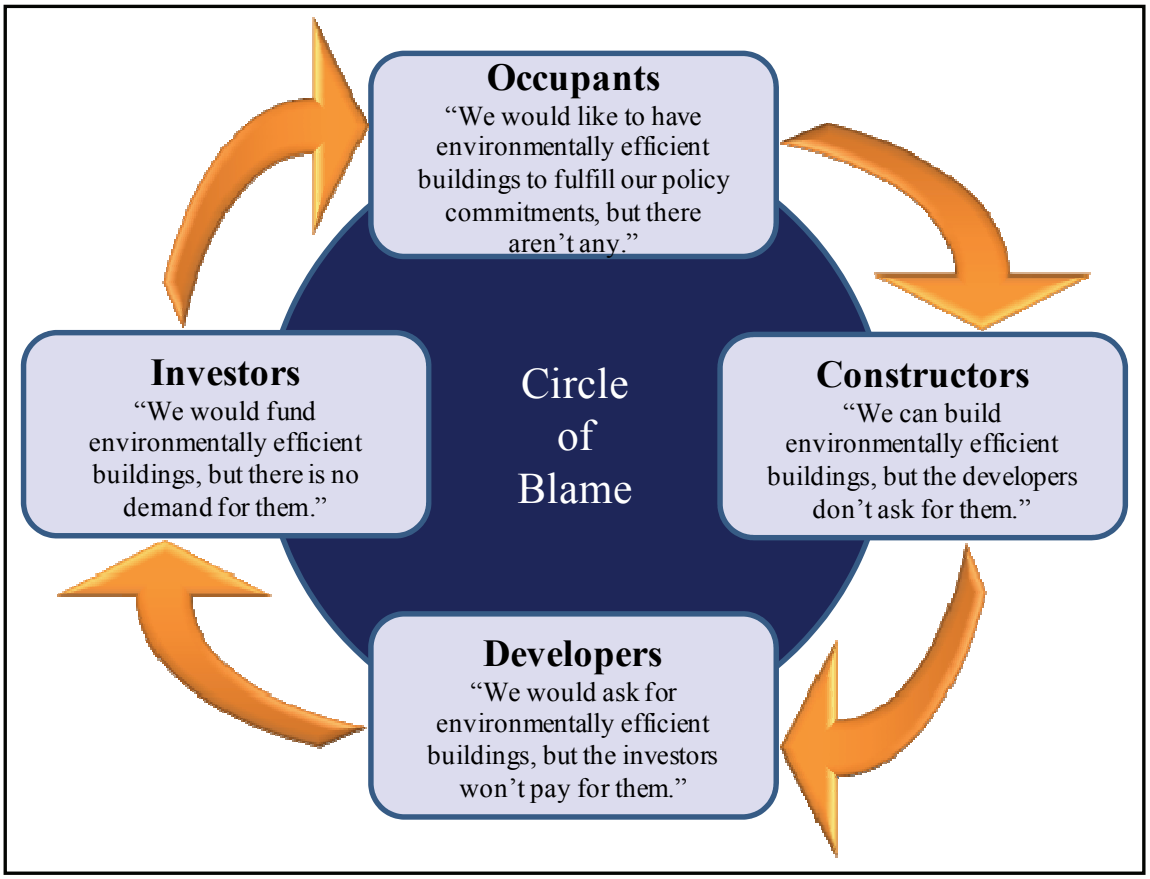
[103] Cf. U.S. Environmental Protection Agency (2008).
[104] Cf. Kats, G. (2003), p. V.
[105] Cf. Lützkendorf, T./Lorenz, D. P. (2005), pp. 214 et seqq.
[106] Cf. Ellision, L./Sayce, S. (2007), p. 290.
[107] Cf. Lützkendorf, T./Lorenz, D. P. (2005), p. 225.

Grimley (2007) produced the following ranking of sustainable building characteristics: energy efficiency, low levels of pollution, good access to public transport, effective monitoring and management of the building's systems, use of sustainable materials in construction, a working environment that promotes staff health and well-being, construction on brownfields and eco-friendly sites and high water efficiency.[108]

Construction technology developments have properly addressed many sustainability concerns. However, despite technological advances and the importance of the sustainability agenda to the property industry, uptake has been slow. Thus, sustainability must be seen as an implementation problem rather than a technical innovation problem.[109] Frequently cited impediments to more comprehensive considerations of sustainability issues by the real estate sector include the lack of a business case and the "circle of blame", illustrated in Figure 4. Central figures across the supply chain in the real estate sector proclaim a desire to be green, but they bemoan the other parties' lack of desire to provide, rent or own these types of properties.[110] For example, an insufficient choice of buildings was ranked as the most important factor impeding tenants from occupying green buildings.[111]

[108] Cf. GVA Grimley (2007a), p. 7.
[109] Cf. Pöschk, J. (2009), p. 9; RICS Research Foundation (April 2007), p. 1; Sayce, S. et al. (2007), p. 630.
[110] Cf. Myers, G. et al. (2008), p. 300; Jones Lang LaSalle (February 2008), p. 3; Ellision, L./Sayce, S. (2007), p. 287; Pett, J./Ramsay, L. (2003), p. 731; Keeping, M. (2000), p. 6.
[111] Cf. Cushman & Wakefield (Spring 2009), p. 16; Jones Lang LaSalle (February 2008), p. 6.

Figure 4: The circle of blame



Source: Adopted from Cadman, D.: The circle of blame. In: Keeping, M. (2000), p. 6.

Using green and sustainable buildings as synonyms for sustainability in the real estate sector implies an emphasis on new construction and re-developments and neglect of the existing stock. However, the rate of new construction and re-development is only about two percent annually in industrialized countries.[112] Moreover, studies using life cycle assessments to determine a building's energy consumption have indicated that significantly more energy is consumed during the operational phase of properties (e.g., heating, cooling, lighting and ventilation) than during the manufacturing phase of building materials or the construction phase of the building.[113] Numerous authors have stressed that key questions relating to sustainability in the real estate industry must explicitly consider a building's life cycle.[114] The greatest potential for improving the sustainability performance of the real estate sector lies in the existing property stock. Thus, the concept of responsible property investment (RPI) has received an increasing amount of attention in the real estate academic literature.[115] RPI en-

[112] Cf. Reed, R. G./Wilkinson, S. J. (2005), pp. 342, 343.
[113] Cf. UNEP Sustainable Buildings & Construction Initiative (2009), pp. 10 et seqq.; Junnila, S. (2004), p. 193.
[114] Cf. Dixon, T. et al. (2008a), p. 463; Lützkendorf, T./Lorenz, D. P. (2005), p. 222.
[115] Cf. UNEP Finance Initiative (2008b); Pivo, G. (2008a); Roberts, C. et al. (2007).

tails a holistic consideration of sustainability in the property investment and management processes. The United Nations Environment Program Finance Initiative (UNEP FI) Property Working Group defines RPI as "property investment or management strategies that go beyond compliance with minimum legal requirements in order to address environmental, social and governance issues."[116] Based on this description, the RPI concept can be seen as the transfer of the CSR concept to the real estate industry. In practice, however, property companies that comprehensively address environmental, social and governance issues often use the terms "CSR" and "sustainability". As mentioned in Chapter 2, an accepted framework that defines a sustainability-oriented company or outlines relevant strategies and mechanisms for considering sustainability in property investment and management cannot be found in academia or in industry.[117] Irrespective of the lack of consensus on this topic, a limited amount of academic research has been conducted. In addition to a discussion of the overall relevance of sustainability and CSR, the development of a comprehensive framework that enables property companies to capitalize on opportunities and minimize risks associated with the sustainability agenda requires an in-depth analysis of sustainability drivers.

3.1.2 Classification of Sustainability Drivers

Numerous research projects have indicated that real estate market players have an interest in sustainability. The reasons given by real estate market participants for addressing sustainability are diverse. For example, an organization occupying a property may seek a better image, reduced costs, recruiting benefits, a healthier working environment and increased job satisfaction for its employees. The real estate investor may strive for a business advantage, a better image and opportunities to outperform competitors by realizing increased property values, higher rents, decreased property costs and lower vacancy rates. In addition, factors, such as national legislation, government and financial incentives and the rise in public concern regarding social and environmental problems, drive real estate market participants to consider sustainability.[118] However, the research framework of this dissertation only necessitates an analysis of the various sustainability drivers from a real estate investor's perspective.

Sustainability influences a real estate investor's long-term economic objectives in various ways. Identifying, evaluating and ranking drivers are difficult tasks, as they affect the ac-

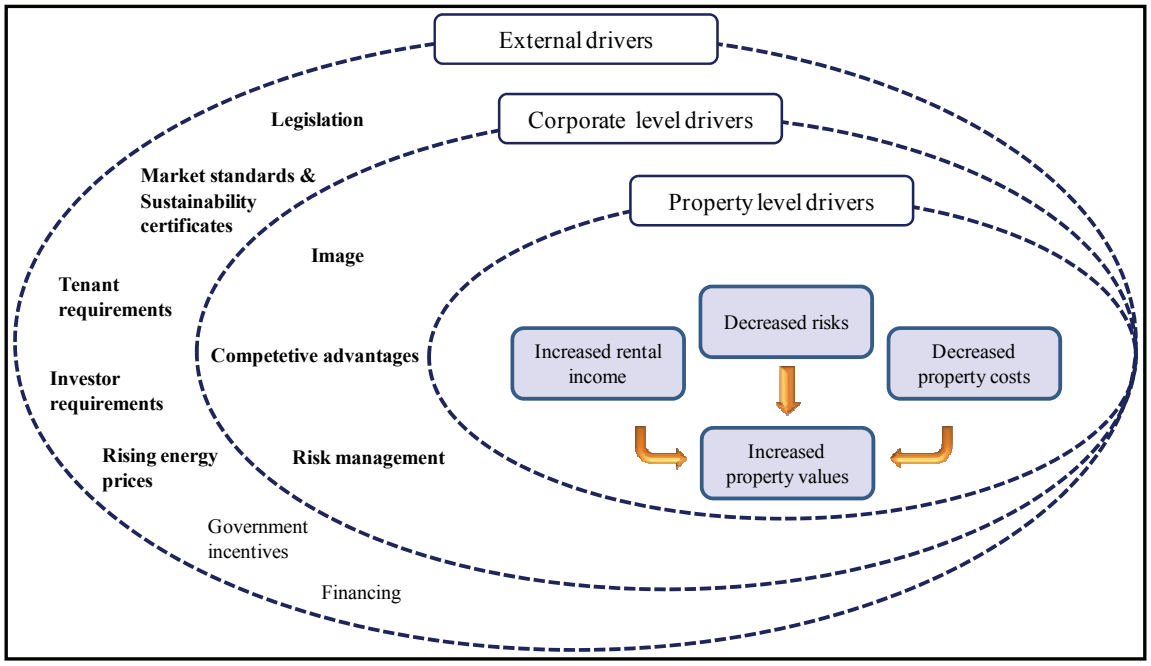
[116] Cf. UNEP Finance Initiative (2007), pp. 3 et seqq.
[117] Cf. Jones, P. et al. (2009), p. 524; Pivo, G. (2009), p. 483; relevant research on RPI is reiterated in Chapter 4.1.1.
[118] Cf. Roberts, C. et al. (2007), p. 390; Jones, P. et al. (2009), p. 523; Pett, J./Ramsay, L. (2003), p. 735; Sustainability drivers are analyzed in detail in Chapter 3.2 and 3.3.

tions of property investors differently. For example, legislation and national standards typically establish minimum requirements, whereas prices, rent levels, financial incentives and taxes affect profits. Whether market-driven, bottom-up incentives or top-down mandatory regulations imposed by governments more effectively prompt the property sector to adopt sustainability is highly contested.[119] Some researchers have stressed the importance of the business case as a prerequisite to the promotion of sustainability initiatives.[120] However, studies focusing on identifying the importance of different drivers often cite legislation and other external factors as the most important drivers and rank economic benefits as less important. For example, the engagement of RICS members with the sustainability agenda is primarily driven by legislation; other important drivers include responsibility to the environment, ethics, clients, the business bottom line and competitive advantage.[121] Similarly, in a survey of the property development sector, Ang and Wilkinson (2008) reported that the five most important reasons for adopting ecologically sustainable projects include a company's CSR initiatives, stakeholder pressure, regulations, personal beliefs and company image gain. In this study, the economic benefits of ecologically sustainable projects were ranked as the least important motivations, but a lack of such incentives and benefits was cited as the most important factor impeding the adoption of ecologically sustainable practices.[122]

Overall, a substantial amount of literature has identified and discussed real estate investors' drivers for considering sustainability.[123] The classification of identified drivers is illustrated in Figure 5. For this purpose, sustainability drivers are categorized as external and corporate-level drivers.

[119] Cf. Fuerst, F./McAllister, P. (June 2008), pp. 3 et seqq.
[120] Cf. Myers, G. et al. (2008), pp. 304, 318; Lützkendorf, T./Lorenz, D. P. (2007), p. 644; Sayce, S. et al. (2007), p. 638; Lützkendorf, T./Lorenz, D. P. (2005), p. 215; Pett, J./Ramsay, L. (2003), p. 734.
[121] Cf. Dixon, T. et al. (2008a), pp. 469 et seqq.
[122] Cf. Ang, S. L./Wilkinson, S. J. (2008), pp. 337–340.
[123] Cf. Falkenbach, H. et al. (2010), pp. 206 et seqq.

Figure 5: The framework of sustainability drivers for the real estate investor



Source: Own illustration; Falkenbach, H./Lindholm, A.-L./Schleich, H. (2010), p. 206.

In the following sections, only the most important sustainability drivers (bolded in Figure 5) are discussed in detail. In contrast to the most important sustainability drivers, the academic literature suggests that government incentives and more favorable financing conditions for sustainable buildings are able to support the adoption of sustainability mechanisms but not to act as primary drivers. Because the business cases for sustainable buildings and investments in energy efficiency in the existing property stock are inconclusive, some academics have stated that government incentives are required to advance sustainability in the property market in the immediate future.[124] Government incentives can include, for example, enhanced capital allowances on energy efficient investments and a lower rate of value-added tax on sustainable construction materials.[125] These mechanisms can be preferable to building regulations because they apply to both the existing and new building stocks. Several survey studies, such as those by the DEGI (2009), Sayce et al. (2007) and Pett and Ramsay (2003), have concluded that financial government incentives are perceived by property market participants to be powerful opportunities to achieve greater sustainability within the property stock in Germany and the U.K.[126] Fiscal measures are diverse in different countries. In Germany, the most important government incentive pertains to subsidies (e.g., state guaranteed

[124] Cf. World Business Council for Sustainable Development (August 2009), pp. 8 et seqq.; Lützkendorf, T./Lorenz, D. P. (2005), pp. 217–219; Pett, J./Ramsay, L. (2003), pp. 735–736.
[125] Cf. World Business Council for Sustainable Development (August 2009), pp. 56 et seqq.
[126] Cf. DEGI Deutsche Gesellschaft für Immobilienfonds (2009), p. 6; Sayce, S. et al. (2007), p. 639; Pett, J./Ramsay, L. (2003), p. 735; The German Property Federation is also actively engaging to support the introduction of government incentives for investments in buildings' energy efficiency.

feed-in tariffs for renewable energy supplied to the grid) that encourage on-site renewable energy generation.[127] A limited number of studies have suggested that sustainable buildings will also benefit from more favorable financing conditions in the future.[128] Benefits should arise when lenders consider that sustainable buildings provide more advantageous risk-return profiles than conventional buildings. However, no research has documented preferable financing conditions for sustainable buildings.

3.2 Corporate External Sustainability Drivers

3.2.1 Laws and Regulations

In the property sector, the number of regulatory requirements related to energy efficiency, reductions in resource consumption and emissions limits has increased during the past few years, and this trend is likely to continue. Legislation affecting all relevant stakeholder groups (e.g., property investors, developers, constructors and occupants) has been introduced at both the international and local levels.[129]

Building regulations establish minimum standards for new buildings. By tightening legislative requirements on the energy efficiency and emissions of buildings, governments increase the quality of the overall building stock and augment prospective tenants' requirements and expectations of buildings. Governments rapidly enforce building regulations. For example, in Germany, legislative requirements on energy efficiency in buildings have been increased four times since 2002.[130] The impacts of permanently tightening building regulations on property investors are expected to be manifold. Possible effects include the risk of enhanced depreciation or obsolescence of properties due to new market standards, higher capital expenditure for maintenance and refurbishment and lower capital values.[131] Table 4 provides an overview of the major building regulations related to sustainability issues. The most important initiatives are further discussed in the following sections.

Table 4: Summary of environmental legislation

Level	Legislation
International	➢ Kyoto Protocol ➢ UN Principles of Responsible Investment

[127] Cf. World Business Council for Sustainable Development (August 2009), pp. 56 et seqq.
[128] Cf. RICS Research Foundation (April 2007), p. 5.
[129] Cf. World Business Council for Sustainable Development (July 2008), pp. 43–45; Newell, G. (2008), pp. 523–525; Sayce, S. et al. (2007), pp. 632 et seqq.; King Sturge (2007/2008), p. 32.
[130] Cf. Schettler-Köhler, H. P. (March 2008), p. 1.
[131] Cf. Dixon, T. et al. (2008b), p. 96; Cushman & Wakefield (August 2008), p. 2.

Europe	➢ Directive on Energy Performance of Buildings ➢ Directive on Environmental Liability ➢ Directive on Taxation of Energy Products and Electricity ➢ Directive on Waste, Electrical and Electronic Equipment
Germany	➢ Energy Saving Ordinance (Energieeinsparverordnung) ➢ Act on the Promotion of Renewable Energies (Erneuerbare-Energien-Wärmegesetz)

Source: Own illustration.

At the international level, the Kyoto Protocol is the most prominent initiative.[132] It establishes binding targets for reducing greenhouse gas (GHG) emissions. Overall, industrialized countries agreed to decrease their collective GHG emissions by 5.2% from 1990 levels by 2012. The European Union intends to achieve reductions of 8% by 2020, and Germany and the U.K. have committed to reduce emissions by 20%.[133] However, in 2009, governments failed to agree on a successor to the Kyoto Protocol, which expires in 2012. Although common action to reduce carbon emissions at the international level may not be realized in the near future, European countries have pledged to uphold their longer-term carbon-reduction commitments.[134]

The EU Energy Performance of Buildings Directive (EPBD) is the most crucial piece of European legislation.[135] Effective as of 4 January, 2003, this directive requires every European country to establish a relevant national law. By introducing the EPBD, the EU is striving to increase the energy efficiency of commercial buildings, to develop a more transparent energy certification program and, thus, to reduce carbon emissions. To achieve these objectives, the directive issues four major mechanisms to be adopted by each country.[136] First, a common methodology for calculating the integrated energy performance of buildings must be introduced in all European member states. Second, minimum standards are established for the energy performance of new buildings and buildings subject to major renovation. Third, the EPBD Directive requires inspections of boilers and central air-conditioning systems. Finally, programs for the energy certification of new and existing buildings must be introduced.[137] Of these mechanisms, the establishment of energy certification programs for buildings is the most far-reaching regulatory intervention. It requires property owners to provide energy performance certificates (EPCs) when a building is constructed, refurbished,

[132] Cf. King Sturge (2005), p. 14.
[133] Cf. United Nations (1998).
[134] Cf. Hufbauer, G. C./Kim, J. (2010).
[135] Cf. Dixon, T. et al. (2008b), p. 97; Pett, J./Ramsay, L. (2003), p. 730.
[136] Cf. Cushman & Wakefield (August 2008), p. 3; King Sturge (2007/2008), p. 35.
[137] Cf. European Union (2003).

sold or rented. These certificates are based on overall energy use, which includes space heating, space cooling, ventilation systems, hot water and lighting, and they enable prospective occupants and property owners to compare the environmental performance of buildings.[138]

Cushman & Wakefield (2009) conducted a survey among 750 landlords and tenants across Europe and found that 69% of respondents expected the EPBD to affect the acquisition and renting of buildings.[139] Similarly, results from a survey of investor attitudes by GVA Grimley in 2007 indicate that large investors expected the EPBD to significantly impact the real estate market. Forty-five percent of large investors expected a major impact, and the remaining fifty-five percent expected some impact.[140]

Additional European legislative initiatives include the Directive on Environmental Liability, the Directive on Taxation of Energy Products and Electricity, the Directive on Waste, Electrical and Electronic Equipment and the Directive on Landfill.[141] However, these initiatives are less important for the property sector.

In Germany, the transposition of the EPBD into national law constitutes the most important legislative initiative related to the energy efficiency and emissions of buildings. Most aspects of the EPBD were included in the Energy Saving Ordinance (Energieeinsparverordnung) of 2002. Missing pieces, such as compulsory certificates for the sale and rental of an existing building, were added in the Energy Saving Ordinance of 2007. The Energy Saving Ordinance of 2009 increased energy performance requirements by 30%, and the 2012 ordinance will do the same.[142]

The main elements of the Energy Saving Ordinance are statutory provisions for the implementation of minimum performance levels for new buildings (§§3-8), existing buildings (§§9-12) and HVAC appliances (§§13-15).[143] In particular, the methodology used to calculate a building's energy performance is important. For this purpose, DIN V 18599 provides a holistic assessment methodology that takes into account a building's thermal envelope,

[138] Cf. Ellision, L./Sayce, S. (2007), pp. 291, 292; Lützkendorf, T./Lorenz, D. P. (2005), pp. 217–219.
[139] Cf. Cushman & Wakefield (Spring 2009), p. 12.
[140] Cf. GVA Grimley (2007a), p. 12.
[141] Cf. King Sturge (2007/2008), pp. 35 et seqq.; King Sturge (2005), p. 17.
[142] Cf. Schettler-Köhler, H. P. (March 2008), p. 1.
[143] Cf. Deutscher Bundestag , §§3,4.

built-in lighting systems and appliances for heating, ventilation, cooling and hot-water supply.[144] To extend the scope of the directive beyond new construction, the Energy Saving Ordinance states that when building fabric elements of heated or cooled spaces are initially installed or changed in existing buildings, energy performance must be improved. In this case, the owner can either meet the special requirements for the respective building element or prove that the building as a whole does not exceed 140% of the requirements for new buildings. Measures addressing less than 20% of the area of the element in question are excluded from these requirements.[145]

To ensure that building appliances comply with state-of-the-art performance levels, boiler inspections have been mandatory in Germany for years, and these inspections are more comprehensive and frequent than those outlined in the EPBD. If a boiler does not meet certain performance standards, property owners are obliged to replace it. Similarly, maintenance is mandatory for air-conditioning installations.[146]

In addition to enforcing compliance with minimum energy efficiency performance standards, the Energy Saving Ordinance requires EPCs to be made available when a building is constructed, rented or sold.[147] They can be issued on the basis of calculated energy demand or metered energy consumption.[148] The former is more comprehensive and highlights the actual performance of buildings. The latter only provides information on the amount of energy used in the previous three years.[149] To achieve comparability with calculation results, the impact of the weather during the metering period is accounted for by standardizing the metered data to fit standard climatic conditions used in calculations of energy performance.

In addition to the Energy Saving Ordinance, the Act on the Promotion of Renewable Energies in the Heat Sector (Erneuerbare-Energien-Wärmegesetz) influences the real estate sector. This act was introduced to increase the share of renewable energies in the heat sector to 14% by 2020. This act mandates that owners of newly constructed buildings cover a share of the thermal energy demand with renewable energies.[150]

[144] Cf. ibid.
[145] Cf. ibid., §9.
[146] Cf. ibid., § 12.
[147] Cf. ibid., §16.
[148] Cf. ibid., §17.
[149] Cf. RICS (September 2008), p. 19.
[150] Cf. Deutscher Bundestag (2009), §1, 3.

Digression: Environmental Legislation in the U.K. and Australia

Examining selected environmental legislation in other countries that goes beyond German legislation is worthwhile because regulatory requirements in other countries can be indicative of future statutory provisions. Moreover, such an analysis describes the regulatory environment that German property investors can expect when investing abroad.

The European Union Emission Trading System is the largest emissions trading scheme in the world and a major component of EU climate policy.[151] However, the property industry has been excluded. In contrast, governments in the U.K. and Australia are working to establish emissions trading schemes (ETSs) that partially cover property market participants. In Australia, the National Greenhouse Emissions Reporting Act (NGERA) requires large property investors to measure and disclose GHG emissions and energy consumption data. Regulations related to the reporting of emissions often precede ETSs because reliable emissions data are considered as prerequisites for these schemes.[152] Similarly, the Carbon Reduction Commitment, established in the U.K., aims to reduce carbon emissions from large, "low energy-intensive" organizations, such as property investment companies. This cap-and-trade scheme requires companies to purchase carbon allowances to cover their projected carbon emissions for future 12-month periods. At the close of each period, companies are required to disclose their electricity usage. Organizations are then ranked according to their energy efficiency achievement, and revenues from the scheme are redistributed to participants. Companies with higher rankings are financially rewarded, and those with lower rankings pay a penalty.[153]

A less influential initiative is the Australian Energy Efficiency Opportunities (EEO) Act. It aims to encourage implementation of cost-effective energy opportunities by requiring companies to identify and evaluate energy efficiency opportunities, which must be publicly reported.[154]

3.2.2 New Market Standards as a Result of Sustainability Rating Schemes

In addition to the introduction of mandatory regulations, the establishment of stakeholder groups to address sustainability issues in the property industry has catalyzed and enhanced

[151] Cf. EU Commission (2010).
[152] Cf. Australian Government - Department of Climate Change , p. 3.
[153] Cf. Department of Energy & Climate Change (2010), p. 4.
[154] Cf. Australian Government - Department of Resources, Energy and Tourism (2006)

the role of sustainability.[155] This trend and pressures to reduce the environmental impact of the building stock have led to the emergence of a range of voluntary industry standards, including building sustainability ratings. These ratings were developed to establish credible standards by which the sustainability of buildings could be judged objectively, to minimize the environmental impact of properties and to facilitate comparisons of the sustainability performance of properties.[156]

Voluntary rating methods increasingly influence investment and renting decisions because they provide tenants and investors with a yardstick to measure the sustainability of properties.[157] The growing importance of sustainability ratings in the marketplace is reflected in the recently increased inventory of certified buildings. Because new commercial buildings seek certification, a shift in the market standard for commercial space is expected.[158] Consequently, buildings that do not account for sustainability may suffer enhanced depreciation, declines in rental levels, discounts in capital value and longer void periods.[159] Thus, certification programs support the idea of "future-proofing" buildings against market-based developments and mitigate downside risk.[160]

Currently, approximately 600 tools are available for evaluating the social, environmental and economic dimensions of building performance.[161] The World Green Building Council and its affiliated regional Green Building Councils have led the development of market-based approaches by introducing voluntary sustainability certification programs. Among these systems, the German-based DGNB seal, the U.K.-based BREEAM and the US-based LEED ratings are the most prevalent and most important schemes in Europe and Germany. Other influential tools include the French HQE, the Australian Green Star, the Japanese CASBEE and the US Energy Star ratings.[162] Appendix 3 provides an overview of the most important certification schemes.

[155] Cf. Pett, J./Ramsay, L. (2003), p. 735.
[156] Cf. Reed, R. et al. (2009), p. 7; Ciochetti, B. A./McGowan, M. D. (February 2009), pp. 15–17.
[157] Cf. Eichholtz, P. et al. (2009a), pp. 5 et seqq.
[158] Cf. Eichholtz, P. et al. (April 2010), p. 2; Ciochetti, B. A./McGowan, M. D. (February 2009), p. 25.
[159] Cf. Fuerst, F./McAllister, P. (June 2008), p. 3; Newell, G. (2008), p. 524.
[160] Cf. Cushman & Wakefield (August 2008), p. 2; Jones Lang LaSalle (February 2008), p. 6; Sayce, S. et al. (2007), p. 634.
[161] Cf. Reed, R. et al. (2009), p. 6.
[162] Cf. King Sturge (2009), p. 4.

Some scholars have argued that different assessment tools are required for the specific circumstances of individual countries, such as climate and the existing building stock.[163] However, the adaptation of assessment methods to local needs and legislation has resulted in the construction of different rating tools with varying parameters. This, in turn, has created complications for property market participants because comparing results from different assessment methodologies is difficult. Developing an understanding of the different certification schemes and their influences on the property market requires an analysis of their assessment criteria and requirements. In the following sections, the most prevalent certification schemes in Germany, namely, the BREEAM, LEED and DGNB systems, are described.[164]

Building Research Establishment Environmental Assessment Method (BREEAM)

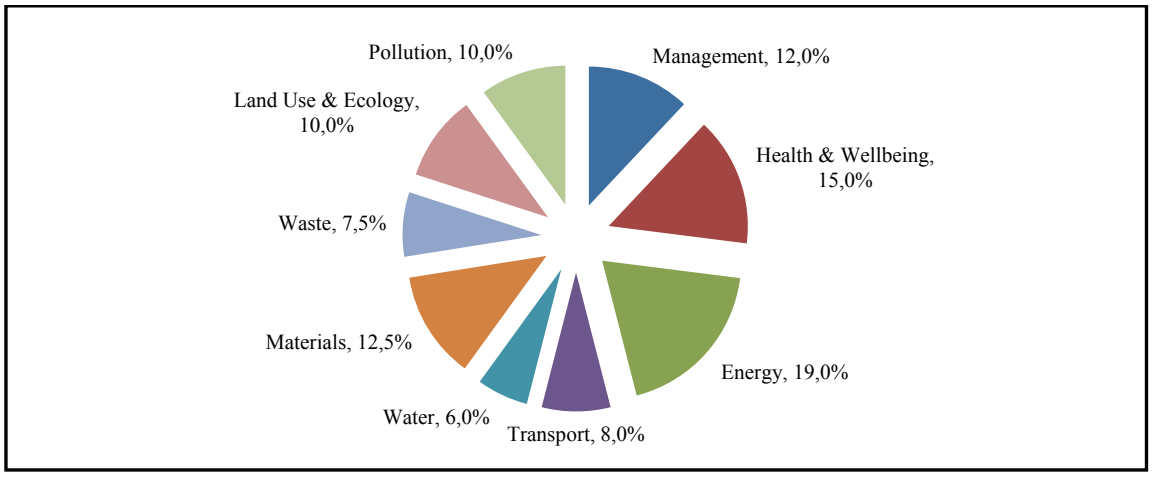
The BREEAM rating was developed by the Building Research Establishment (BRE) in 1990. It is the longest-established and most widely used environmental assessment method in the world, with 115,000 buildings certified and nearly 700,000 registered.[165] The BRE Trust provides specific schemes adjusted by property type, such as offices, courts, industrial units, prisons, retail buildings, schools, multi-residential buildings and ecoHomes. The BREEAM rating also offers a customizable tool for buildings not in the standard categories, such as hotels, resorts, laboratories and university buildings. Assessment schemes for some property types are further split into programs for existing buildings and newly developed properties.[166] Recently, the International Council of Shopping Centers adopted the BREEAM rating as its European sustainability standard.[167]

The BREEAM rating is based on the assessment of nine sustainability sections, which are further sub-divided. These sections include management, health & wellbeing, energy, transport, water, materials, waste, land use & ecology and pollution. Additionally, buildings can gain innovation credits for innovative features or processes not covered in the assessment methodology.[168] For each criterion, the BRE determines benchmarks and targets, which are above legislative requirements. Credits are awarded to properties for meeting

[163] Cf. Sinou, M./Kyvelou, S. (2006), p. 570.
[164] Each labeling organization provides specific assessment schemes for different property types (e.g. office, retail, new construction, existing properties). The following analysis in each case is based on sustainability assessment for new constructed office space.
[165] Cf. Building Research Establishment (2008b), p. 9.
[166] Cf. Building Research Establishment (2007), pp. 17 et seqq; the BREEAM In-Use tool can currently only be used to register assets within the U.K.
[167] Cf. Cushman & Wakefield (August 2008), p. 4.
[168] Cf. Building Research Establishment (2008b), pp. 34 et seqq.

BREEAM benchmarks. The percentage of credits is calculated for each BREEAM section. The results are multiplied by the corresponding BREEAM section weightings and summed to give a preliminary score. In some sections, the BREEAM rating requires properties to achieve minimum scores to be eligible for certification. The minimum score varies depending on the certification level. Based on the final score, the BREEAM rating classifies a building into categories of outstanding, excellent, very good, good, pass and unclassified.[169] The BREEAM sections that are assessed in the certification process and their corresponding weightings are summarized in Figure 6. A complete list of the criteria analyzed in each section can be found in Appendix 4.[170]

Figure 6: BREEAM assessment sections and weightings



Source: Own illustration based on Building Research Establishment (2008b), p. 34.

The weightings of each section are determined at regular intervals with surveys of professionals from different branches of the real estate sector. This approach ensures that the latest developments in the sustainability field are considered in the certification process.[171]

Leadership in Energy and Environmental Design (LEED)

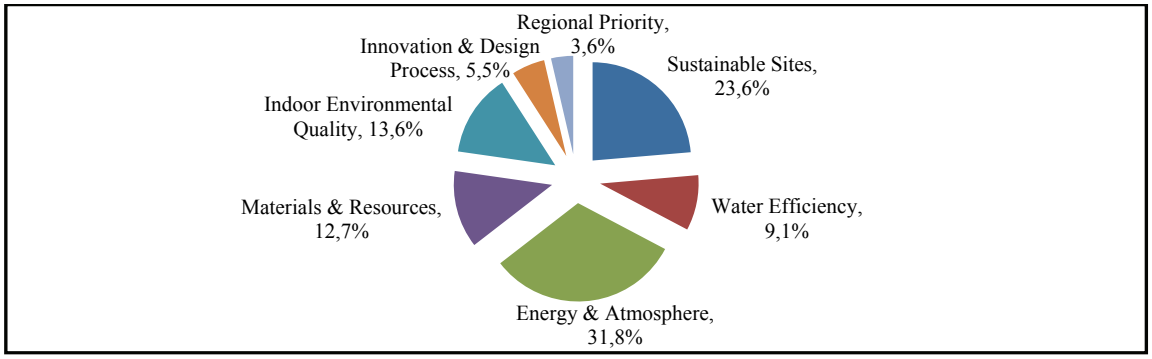
In 2000, the U.S. Green Building Council introduced the LEED green building rating system, one of the best-known sustainability assessment tools, which has been used for 3,500 office buildings.[172] The U.S. Green Building Council offers various LEED schemes, which are adjusted to the specific needs of different property types. Available schemes include LEED for New Construction and Major Renovation Projects (LEED-NC), LEED for Existing Building Operations and Maintenance (LEED-EB), LEED for Commercial Interiors Pro-

[169] Cf. Building Research Establishment (2008b), pp. 28, 33.
[170] See Appendix 4.
[171] Cf. Building Research Establishment (2008b), p. 28.
[172] Cf. Deutsche Bank (Mai 2010), p. 14; certified units as of 3Q 2009.

jects (LEED-CI), LEED for Core and Shell Development Projects (LEED-CS), LEED for Homes, LEED for Neighborhood Development, LEED for Schools, LEED for Healthcare and LEED for Retail. Additional schemes, such as LEED for Laboratories, are under development and will be implemented in the near future.[173]

The LEED system evaluates the performance of properties by assessing seven categories of sustainability related to human and environmental health. Categories encompass the following sustainability aspects: sustainable sites, water efficiency, energy & atmosphere, materials & resources, indoor environmental quality, innovation & design processes and regional priority.[174] By sectioning these categories into several criteria, the LEED system provides a comprehensive tool to assess the sustainability performance of buildings. Targets and benchmarks defined for each criterion are beyond U.S. building codes and represent generally accepted and proven standards. Properties earn credit points by meeting requirements in different criteria. A LEED certificate is awarded based on the aggregate score, and the levels of certification include platinum, gold, silver and certified. As a result of the simple method of summing credit points, LEED ratings could be achieved without earning credit points in specific sections. For this reason, the U.S. Green Building Council has determined criteria that must be fulfilled prior to certification.[175] Categories assessed in the LEED certification process and their corresponding weightings are illustrated in Figure 7. A list of all criteria, including prerequisite criteria, is given in the appendix.[176]

Figure 7: LEED assessment sections and weightings



Source: Own illustration based on U.S. Green Building Council (2009), p. 1.

[173] Cf. U.S. Green Building Council (2010b).
[174] Cf. U.S. Green Building Council (2009), pp. 1 et seqq.
[175] Cf. U.S. Green Building Council (2009), pp. XI et seqq.
[176] See Appendix 5 and Appendix 6; due to the DGNB assessment only being available for new construction, the following comparison of building sustainability certification systems rests upon schemes for newly build properties. Therefore, Appendix 5 provides the assessment criteria for LEED for New Construction. Appendix 6 gives the assessment criteria for LEED for Existing Building Operations as this scheme is going to be of importance in Chapter 5.

Figure 7 reveals that energy & atmosphere and sustainable sites are the most important sustainability features in the LEED assessment. This emphasis indicates that the U.S. Green Building Council assumes that building performance in these sections has the most potential to benefit human and environmental health.

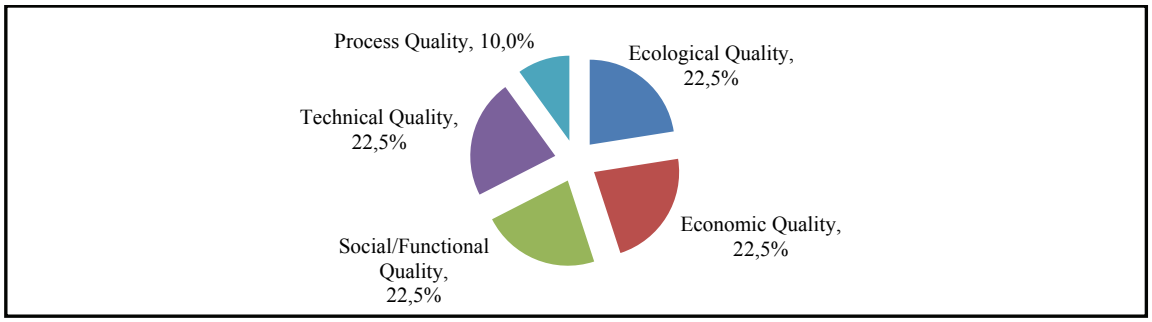
DGNB Seal

The DGNB seal was introduced by the German Sustainable Building Council (DGNB) in 2009. Because it was developed recently, only 111 buildings have been certified.[177] The DGNB certification is available for newly constructed offices, retail units, industrial units, schools, residential and hotel buildings as well as for refurbishments of office properties. In addition, the DGNB plans to introduce additional schemes, such as rating tools for existing office buildings, urban development projects, laboratories and commercial interiors.[178]

The DGNB rating is the first sustainability assessment method that explicitly incorporates the three pillars of sustainability. In addition to assessing a building's ecological, economic and social qualities, the DGNB rating considers technical and process qualities. The latter two represent cross-sectional criteria related to the construction and operation of buildings. Each sustainability dimension is sub-divided into several criteria in which building performance is compared to specific targets and benchmarks. The target achievement of buildings is rated on a scale of 1 to 10 for each criterion. To calculate the final score, both the criteria and the sections are weighted. The DGNB assessment approach explicitly considers a building's life cycle performance across all sustainability dimensions.[179] In the framework of DGNB ratings, properties are classified as bronze, silver or gold.[180] The weighting of assessment sections in the DGNB system is shown in Figure 8. A comprehensive list of all assessment criteria and their weightings are given in the appendix.[181]

[177] Cf. Deutsche Gesellschaft für Nachhaltiges Bauen e.V. (German Sustainable Building Council (2010a); certified units as of August 2010.
[178] Cf. Deutsche Gesellschaft für Nachhaltiges Bauen e.V. (German Sustainable Building Council (2010b).
[179] Cf. Mösle, P. et al. (2009), p. 88.
[180] Cf. Deutsche Gesellschaft für Nachhaltiges Bauen e.V. (2009), p. 11.
[181] See Appendix 7.

Figure 8: DGNB assessment sections and weightings



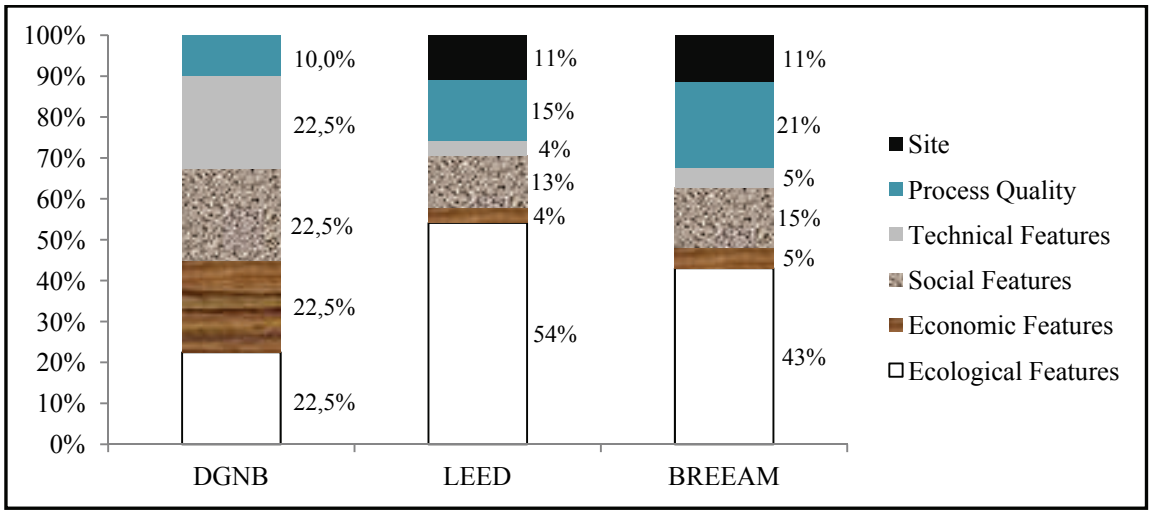
Source: Own illustration based on Deutsche Gesellschaft für Nachhaltiges Bauen e.V. (2009), p. 11.

The equal weighting of sections means that each category has the same impact on the final result. The property site is assessed separately and not included in the DGNB certification rating.[182]

A comparison of the assessment criteria of various certification systems reveals disparities in the sustainability standards of different schemes. While the BREEAM and LEED certifications are similar, the DGNB certification differs considerably. The BREEAM and LEED certifications emphasize ecological and social criteria. On the contrary, the DGNB rating explicitly considers economic aspects. Therefore, BREEAM- and LEED-accredited buildings can be regarded as green buildings, while DGNB-certified buildings can be regarded as sustainable buildings.[183] Moreover, the DGNB seal, in contrast to the BREEAM and LEED certifications, considers property location in a separate rating. Figure 9 displays the differing emphases in the assessment methodologies of the DGNB, LEED and BREEAM systems. The criteria of the LEED and BREEAM systems are assigned to the DGNB system because it is based on the definition of sustainability described in Chapter 2.

[182] Cf. Deutsche Gesellschaft für Nachhaltiges Bauen e.V. (2009), p. 12.
[183] Definitions of green buildings and sustainable buildings; see Chapter 3.1.1.

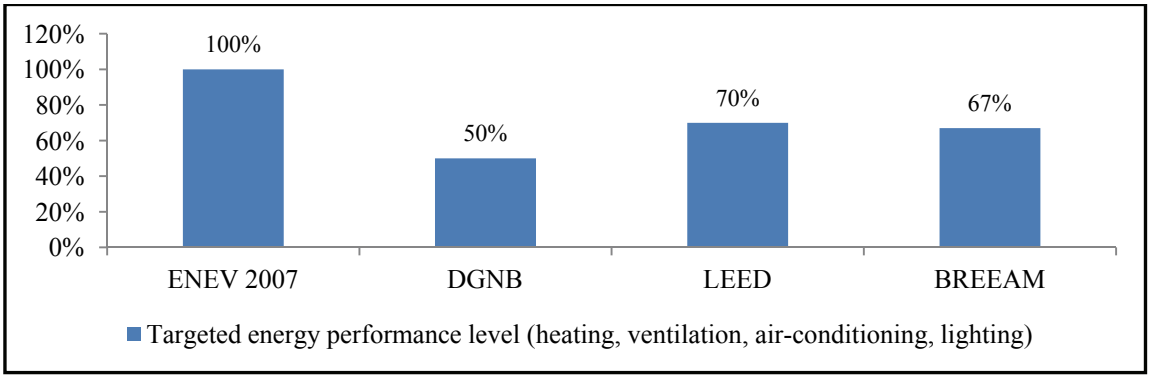
Figure 9: Comparison of the DGNB, LEED and BREEAM criteria weightings



Source: Own illustration.

Rating tools differ not only in the criteria used for assessing building sustainability performance but also in the standards defined as common criteria.[184] Each rating tool establishes requirements that surpass local building codes and regulations. However, these requirements vary considerably among countries. Thus, reliance on local building standards as a minimum starting point for sustainability certification systems affects subsequent ratings. For example, building code standards in the U.S.A. and U.K. are lower than those in Germany.[185] Consequently, the DGNB system requires higher standards than the LEED and BREEAM systems. This higher standard is shown in Figure 10, which shows the energy performance levels for heating, ventilation, air-conditioning and lighting for the DGNB, LEED and BREEAM systems.[186]

Figure 10: Targeted energy performance levels for certification systems



Source: Mösle, P., et al. (2009), p. 91.

[184] Cf. King Sturge (2009), p. 6; Building Research Establishment (2008a), p. 38.
[185] Cf. Reed, R. et al. (2009), p. 13.
[186] Cf. Mösle, P. et al. (2009), p. 91.

After comparing the criteria and requirements of the DGNB, LEED and BREEAM systems to a sample of all criteria contained in one of these three sustainability ratings, Drees & Sommer (2009) concluded that the DGNB seal is the most comprehensive and the most challenging sustainability rating tool. In addition, their results reveal that although the ecological dimension is more heavily weighted in the LEED and BREEAM systems, the DGNB seal includes more and stricter criteria.[187]

Aside from the sustainability rating tools developed by green building councils, real estate consultancy firms offer property sustainability benchmarking services. Among these services, IPD's Environment Code is the best-known assessment methodology. IPD argues that the cost, time and resources needed to undertake the BREEAM, LEED and DGNB assessments are prohibitive and, as such, the use of these tools in their current form is restricted to "flagship" buildings. In response, IPD developed the Environment Code for simply and cost-effectively collecting, analyzing and reporting environmental performance information on properties.[188] By standardizing a framework for measuring property sustainability characteristics, the Environment Code provides a reliable and consistent information base for property owners. This base allows managers to internally conduct an environmental property analysis, to benchmark their companies' portfolio and properties against other peer organizations and to take effective action to improve environmental performance.

To develop the Environment Code, the IPD used established approaches for building management and sustainable construction, such as the BREEAM and LEED systems. The Environment Code assessment methodology contains quantitative and qualitative measures. The former group focuses on energy, water and waste metrics, such as imported energy (electricity, fossil fuels, renewable fuels and communal non-electrical energy), on-site renewable energy, carbon emissions, measures for compensating and offsetting carbon emissions and sub-metered energy uses. The latter group examines property characteristics related to energy, water, waste, transport and travel, equipment and appliances, health and well-being and adaptation to climate change.[189] Appendix 8 summarizes all assessment criteria in the Environment Code.[190]

[187] Cf. ibid., p. 93.
[188] Cf. Investment Property Databank (2008a), p. 10.
[189] Cf. Investment Property Databank (2008a), p. 14.
[190] See Appendix 8.

3.2.3 Sustainability Interests of Occupants

The increased interest in and attention to sustainability has brought the CSR commitments of corporations into the mainstream and established their importance in strategic decision making. Occupying sustainable buildings allows firms to easily demonstrate their environmental and social awareness and to bolster their sustainability agendas.[191] As a result, the sustainability agenda increasingly influences corporations' decisions to occupy more sustainable buildings.[192] Jones Lang LaSalle's (2008) survey of occupants' perspectives on sustainability confirmed that sustainability is emerging as an important factor in corporate lease decision making, with 47% of global respondents considering sustainability to be a critical issue. An additional 25% of participants indicated that sustainability will become a critical issue within two years.[193] Investors' perceptions of occupants' attitudes about sustainability support this result. GVA Grimley's (2007) research results reveal that 79% of property investors believed occupants attach some importance to sustainability. An additional 14% assumed that it was a very important issue for tenants.[194]

The introduction of statutory energy performance certificates and market-based certification programs (e.g., the LEED, BREEAM and DGNB systems) provide the opportunity for occupants to easily assess the sustainability of their rented space and to demonstrate their environmental and social awareness. The growing influence of these approaches is apparent as entities begin to draw on sustainability certification systems to establish minimum requirements for occupied buildings to further promote their CSR initiatives. Occupants in the vanguard are typically governmental bodies and global corporations.[195] Examples of countries in which the government has mandated sustainability occupancy requirements for their own rental activities are Australia, New Zealand and the U.S.A.[196] Examples of corporations that have taken a proactive approach to their role in the environment are Google, Deutsche Bank and Munich RE.[197] These companies rely on dedicated occupational sustainability requirements as they aim to become carbon neutral. Corporate real estate is an initial point of entry through which these companies can achieve their goals because 82% of the environmental impact per employee of service-sector companies is linked with the location, design and

[191] Cf. Ciochetti, B. A./McGowan, M. D. (February 2009), pp. 5–8.
[192] Cf. Investment Property Databank (2008b), p. 18; Cushman & Wakefield (August 2008), p. 5; Ellision, L./Sayce, S. (2007), p. 299; Pett, J./Ramsay, L. (2003), p. 733.
[193] Cf. Jones Lang LaSalle (February 2008), p. 3.
[194] Cf. GVA Grimley (2007a), p. 12.
[195] Cf. Jones Lang LaSalle (February 2008), pp. 4–6; Myers, G. et al. (2008), pp. 308 et seqq.
[196] Cf. Myers, G. et al. (2008), p. 308.
[197] Cf. Deutsche Bank (2010b); Munich RE (2010); Google (2010).

operation of the built environment.[198] Similarly, Cushman & Wakefield (2009) surveyed the sustainability ratings required by tenants renting a building and found that energy performance certificates imposed by the EPBD represented the minimum standard. In addition to this standard, the BREEAM Very Good (10%), BREEAM Good (8%) and LEED Silver (8%) ratings were used to define minimum occupational sustainability requirements. However, the majority of tenants surveyed admitted that they did not know their company's occupational sustainability requirements.[199]

In addition to occupying sustainable premises to achieve CSR targets, the willingness of tenants to seek sustainable real estate has been explained by the benefits that accrue to tenants, such as increased occupant productivity, improved perception by customers and employees and lowered building-related operational costs. The environmental performance of an occupied property directly impacts an organization's ability to reduce its building-related operational costs and carbon footprint.[200] In practice, however, research evaluating the importance of operating costs for tenants is inconclusive. For example, Jones Lang LaSalle (2008) suggested that rising operating costs were the most influential factor for increasing the importance of sustainability among corporate occupants.[201] In contrast, Holmes and Hudson (2002) found in their interview study that a BREEAM rating or lower long-term operating costs did not affect the decision-making process of potential tenants.[202] This view is also supported by Shiers (1999), who suggested that tenants did not have much interest in the operating costs of a property, and by Cushman & Wakefield (2009), who reported that only 16% of tenants considered energy efficiency ratings when choosing a building.[203] Many companies neglect operating costs during rental decision making because these costs typically account for a small fraction of overall corporate expenses.[204] In contrast, staff salaries represent a much larger proportion of corporate outlay. Therefore, improving employee well-being and enhancing productivity is another value driver for tenants seeking and occupying sustainable properties. Several studies have indicated a strong positive relationship between a building's indoor environmental quality (e.g., indoor air quality) and employee

[198] Cf. Munich RE (2010); Ciochetti, B. A./McGowan, M. D. (February 2009), p. 5; Junnila, S. (2004), pp. 195 et seqq; For example, in 2007, Munich RE approved a carbon-neutral strategy. The first major milestone was reached when Munich RE's offices went carbon-neutral in 2009.
[199] Cf. Cushman & Wakefield (Spring 2009), p. 14.
[200] For an in-depth discussion of the operating cost benefits of sustainable properties, see Chapter 3.4.2.; Eichholtz, P. et al. (2009a), p. 6; Fuerst, F./McAllister, P. (June 2008), p. 3; Jones Lang LaSalle (February 2008), p. 4; Szyman, A./McNamara, P. (2008), p. 10; GVA Grimley (2007b), p. 4.
[201] Cf. Jones Lang LaSalle (February 2008), pp. 7, 8.
[202] Cf. Holmes, J./Hudson, G. (2002), p. 74; the study is focused on only one case study and therefore solely provides preliminary indications.
[203] Cf. Cushman & Wakefield (Spring 2009), p. 13; Shiers, D. (2000), pp. 363, 364.
[204] Cf. Sayce, S. et al. (2007), pp. 634 et seqq.; Pett, J./Ramsay, L. (2003), pp. 733 et seqq.

health and productivity.[205] Miller et al. (2009) investigated the productivity benefits for tenants located in LEED- or Energy Star-certified buildings. Productivity was measured by the number of sick days and changes in the self-reported productivity following relocation to a new building. The final research sample consisted of 154 buildings and 534 tenant responses. The survey results show that 12% of respondents strongly agreed that employees were more productive, 42.5% agreed that employee productivity had increased and 45% suggested no change. The authors detected a 4.88% increase in employee productivity for those tenants who claimed greater productivity after moving. Moreover, 45% of respondents recorded fewer employee sick days, 45% reported no change and 10% experienced more sick days.[206]

In one of the most comprehensive research projects on the subject, the Carnegie Mellon University surveyed more than 1,000 studies that related technical building attributes, such as lighting, thermal control and ventilation, to employee productivity. Results from their meta-analysis show that increases in tenant control over ventilation, temperature and lighting improved productivity by 0.5% to 34%. On average, productivity increased by 7.1%, 1.8% and 1.2% with lighting control, ventilation control and thermal control, respectively. Additionally, improvements have been reported for increased day lighting.[207] In general, numerous studies have concluded that improved building performance in areas such as lighting, ventilation and thermal control are associated with increased occupant well-being and productivity. Yet, establishing a quantitative link between the indoor environment and productivity is challenging and controversial, as reflected by the vagueness of estimated benefits. However, features determined to be relevant to improvements in indoor environmental quality and tenant productivity are common in sustainable buildings and constitute crucial elements of building sustainability certifications.

Additional benefits can arise indirectly from improved corporate reputations, inducing tenants to locate in sustainable buildings.[208] Fombrun (1996) argued that a firm's reputation consists of credibility, trustworthiness, reliability and responsibility.[209] Therefore, leasing space in sustainable buildings can clearly indicate a tenant's environmental and social

[205] Cf. Miller, N. et al. (2009); Kats, G. (2003), pp. 54 et seqq.; Apte, M. G. et al. (2000); Fisk, W. J./Rosenfeld, A. H. (1997).
[206] Cf. Miller, N. et al. (2009), pp. 81 et seqq.
[207] Cf. Kats, G. (2003), p. 54.
[208] Cf. Cushman & Wakefield (Spring 2009), p. 14; Szyman, A./McNamara, P. (2008), p. 10; GVA Grimley (2007b), p. 4.
[209] Cf. Fombrun, C. et al. (2000), pp. 87 et seqq.

awareness. A superior corporate reputation can enable firms to increase sales, charge premium prices and attract and retain a superior workforce, though possible benefits are difficult to quantify.[210] The refurbishment of the Deutsche Bank headquarters to achieve the first platinum LEED certification for a high rise refurbishment is the most famous example of a corporation "going green" to improve its reputation.[211]

Despite indications of increased tenant awareness of sustainable space and specific sustainability measures by governments and global corporations, Cushman & Wakefield (2007) suggested that few tenants have taken direct steps to improve the sustainability of their occupied space. For example, only 13% of office tenants had examined carbon emissions from their premises, and only 8% planned to lease green space.[212] Further, Eichholtz et al. (2009) scrutinized the occupational behavior of different industry sectors for their treatment of certified office space in the U.S. real estate market. The authors compared the occupancy characteristics of green buildings to those of non-certified properties. Their results show that oil, mining, manufacturing, legal and financial service companies as well as public administration providers leased a substantial share of green office space. However, empirical findings only detected a significant commitment to leasing sustainable space in the manufacturing and mining industries and the public administration sector. In general, the authors concluded from empirical evidence that the largest and most visible firms in the other industries have acted as green leaders, while the critical mass had not yet moved. Eichholtz et al. (2009) also found that for some corporations, the leasing of sustainably certified space evolved out of a preference for high-quality space and a need for additional space. Certified buildings tend to be younger, have higher quality ratings and offer more amenities compared to regular buildings.[213]

Although the majority of tenants have not taken direct action to embrace sustainability, some occupants, particularly governmental authorities and "blue chip" organizations, are increasingly considering sustainability issues in their leasing behavior. This trend suggests that the sustainability performance of properties is significant for building owners seeking to attract this type of occupant. Conversely, it can be argued that larger occupants, such as governments and global corporations, establish new market standards and, thus, affect overall market behavior. Tenants seeking and occupying sustainable properties will support price

[210] Cf. Creyer, E. H./Ross, W. T. (1997); Turban, D. B./Greening Daniel W. (1996).
[211] Cf. Deutsche Bank (2010a).
[212] Cf. Cushman & Wakefield (2007), pp. 10, 11.
[213] Cf. Eichholtz, P. et al. (2009a).

segmentation in the rental market. Market expectations of the development of a new asset class of sustainable properties were reported by AtisReal (2008).[214] In the long term, buildings that do not meet sustainability criteria risk faster depreciation, increased capital outlays on more rapid refurbishment, decreased demand, longer void periods and reduced returns.[215]

3.2.4 Sustainability Interests of Shareholders

Other than tenants, the institutional investment community is increasingly embracing concepts of sustainability and CSR. The consideration of environmental and social factors in (equity) investments is characterized by confusion over semantics and definitions.[216] Nonetheless, socially responsible investment (SRI) has become the most widely acknowledged term.[217] The SRI concept describes any investment approach that merges an investor's financial goals with concerns about non-financial factors such as environmental, social and governance (ESG) issues.[218] Thus, SRI requires the integration of ESG indicators into traditional financial analysis and the consideration of environmental and social issues beyond compliance with minimal legal requirements.[219] However, the inclusion of ESG issues into mainstream investment analyses is contested.[220]

The adoption of ESG principles in investment decision making by institutional investors is driven by several factors. First, investors are increasingly convinced that CSR promotes enlightened and disciplined management and, thus, represents an important success factor for companies. Several empirical studies have strengthened the business case by providing evidence that corporations that consider CSR outperform their competitors in terms of operating and stock performances.[221] Sustainability leaders are increasingly expected to provide superior performance and favorable risk return profiles to investors. However, evidence of the superior performance of SRI investors is inconclusive.[222] Second, the institutional in-

[214] Cf. AtisReal (2008), pp. 7, 8.
[215] Cf. Cushman & Wakefield (August 2008), p. 2; Sayce, S. et al. (2007), p. 638; RICS Research Foundation (April 2007), p. 3; Ellision, L./Sayce, S. (2007), p. 299.
[216] Cf. Sethi, P. (2005), pp. 99 et seqq.; Cox, P. et al. (2004), pp. 27 et seqq.; Hallerbach, W. et al. (2004), pp. 517–520; Sparkes, R./Cowton, C. J. (2004), pp. 46 et seqq.
[217] Cf. Sparkes, R./Cowton, C. J. (2004), pp. 46 et seqq.; SRI is closely linked to CSR. While the former refers to the financial investment practice, the latter is concerned with a company's commitment to reducing the impacts associated with its corporate business operations and processes. Thereby, SRI primarily relates to indirect investments in equities. In contrast, RPI refers to the sustainability issues in direct property investments.
[218] In the SRI arena, ESG is the most prevalent term describing sustainability issues.
[219] Cf. Eurosif (2008), pp. 6 et seqq.; Social Investment Forum (2008); UNEP Finance Initiative (2006); Sethi, P. (2005).
[220] Cf. Roberts, C. et al. (2007), pp. 389–391.
[221] For an in-depth discussion of the CSR-financial performance link, see Chapter 2.1.
[222] Cf. Renneboog, L. et al. (2008), pp. 1737 et seqq.

vestment community is increasingly affected by legislation and external media pressure regarding the sustainability of their investments. For example, pension funds in Germany and the U.K. are required to identify and disclose the role of social, environmental and ethical considerations in their investments.[223] Hence, sustainability advocates argue that the incorporation of environmental and social issues into the financial investment decision framework is not an option for institutional investors but an imperative.[224] Third, the consideration of CSR issues in investment decisions and asset allocations will become a matter of risk management. Institutional investors are increasingly interested in investigating and determining the exposure to environmental and carbon risks of the companies in which they invest.[225] The materiality of climate change in investment valuation will further increase as CO_2 regulations and emission trading systems become more prevalent around the world.[226] Initiatives such as the Carbon Disclosure Project (CDP) and TruCost that aim to improve the transparency of carbon costs and risks also increase the importance of climate risk management in institutional investors' portfolios.[227]

A multitude of approaches and underlying practices can be used to integrate ESG issues into investment decision making.[228] For several years, the avoidance screening of offensive issues, companies and sectors (simple/ethical exclusions[229]) has dominated the agenda.[230] However, as the SRI industry has become more complex and mature, the emphasis of SRI activities has shifted from a screening avoidance paradigm to a more holistic approach.[231] Prevalent SRI strategies other than the simple/ethical exclusions include different types of positive screens[232] (e.g., best in class and SRI theme funds), engagement[233] (e.g., sharehold-

[223] Cf. Eurosif (2008), pp. 30, 31; King Sturge (2005), p. 5; U.K. and German pension funds have a reporting obligation under the Pension Disclosure Regulations 2000 (U.K.) and the Pension Contracts Certification Act (Altersvorsorgeverträge-Zertifizierungsgesetz AltZertG) §7 (Germany).
[224] Cf. Sethi, P. (2005); Guenster, N. et al. (July 2005), pp. 3 et seqq.; Cox, P. et al. (2004), pp. 30–33.
[225] Cf. Carbon Disclosure Project (2010e); Trucost (July 2009); Mercer/Carbon Disclosure Project (2009), p. 13.
[226] Cf. Carbon Disclosure Project/Bundesverband Investment und Asset Management (2008), p. 13.
[227] Cf. Carbon Disclosure Project (2010d); Trucost (2010); For an in-depth description of CDP, see Chapter 4.1.4.
[228] Cf. UNEP Finance Initiative (March 2009), pp. 6, 7; Social Investment Forum (2008), p. III; Eurosif (2008), pp. 54 et seqq.
[229] Exclusions: an approach that excludes given sectors or companies from a fund if involved in certain activities, e.g. arms manufacture, animal testing.
[230] Cf. Sparkes, R./Cowton, C. J. (2004), p. 47; Schepers, D. H./Sethi, P. (2003), p. 18.
[231] Cf. Dillenburg, S. et al. (2003), pp. 167 et seqq.
[232] Positive screening: the selection of stocks of companies that perform best against a defined set of ESG criteria.
[233] Engagement: a long-term process of dialogue with companies which seeks to influence company behavior in relation to their social and environmental practices.

er advocacy), integration[234] and community investing.[235] Moreover, the SRI investment approach is often associated with requirements on the reporting of activities and progress of ESG implementation.[236] SRI practices are rarely performed individually. Hence, the application of different measures and the combination of measures result in varying degrees of SRI.[237] As the concept of SRI has matured, the available SRI mechanisms have expanded. This concept has evolved from an approach conducted by a small number of specialist retail funds to an investment philosophy applied by a growing proportion of large institutional investors. At this juncture, large institutional investors, such as pension funds, tend to apply SRI practices, such as positive screens, integration and engagement, which are particularly appropriate for large investment portfolios.[238]

The adoption of ESG principles in traditional financial valuations requires investors to define and measure the environmental and social performance of the potential investee company's operations.[239] CSR reporting by the investee company enables SRI investors to easily assess a company's environmental and social performance. This reporting illustrates one of the main interactions between CSR and SRI: CSR reporting by investee companies is partially designed to satisfy the requirements of SRI investors.[240] SRI indices are another important source of information. They provide rankings of the CSR performance of a limited selection of companies.[241] The most well-known indices are the Dow Jones Sustainability Index, the FTSE4Good Index and the Domini Social Index. Their results, however, vary considerably due to the use of different criteria to asses CSR performance.[242]

The SRI agenda has rapidly developed in recent years. The increasing interest among a wide range of investors is reflected by the participation of signatories with more than US$ 18 trillion in assets in the UN Principles for Responsible Investment (UN PRI) program.[243] In Europe and the Americas, the total amount of SRI assets under management is more than €2,665 trillion and US$2,719 trillion, respectively, attesting to the growth of the SRI move-

[234] Integration: the explicit inclusion of ESG issues into traditional financial analysis.
[235] Cf. Eurosif (2008), pp. 11 et seqq.; Social Investment Forum (2008); Harrington, C. (2003).
[236] Cf. UNEP Finance Initiative (2006).
[237] Cf. UNEP Finance Initiative (March 2009), p. 6.
[238] Cf. Eurosif (2008), pp. 11 et seqq.; Sethi, P. (2005), p. 101; Sparkes, R./Cowton, C. J. (2004), p. 45.
[239] Cf. Hallerbach, W. et al. (2004), pp. 518, 519.
[240] Cf. Roberts, C. et al. (2007), pp. 389–391; Cox, P. et al. (2004), pp. 27 et seqq.
[241] Cf. Adam, A. M./Shavit, T. (2008), pp. 900 et seqq.
[242] For an in-depth discussion of the SRI indices see Chapter 4.1.2.
[243] Cf. UNEP Finance Initiative (2010), p. 2; UN PRI is an initiative promoting the integration of sustainability factors into investment decision making. For an in-depth discussion of UN PRI see Chapter 4.1.4.

ment and the shift of SRI into the mainstream.[244] The engagement of SRI investors is also apparent in the 359 shareholder resolutions that were filed on environmental and social issues by the RiskMetrics Group on behalf of institutional shareholders in the 2009 U.S. proxy season.[245]

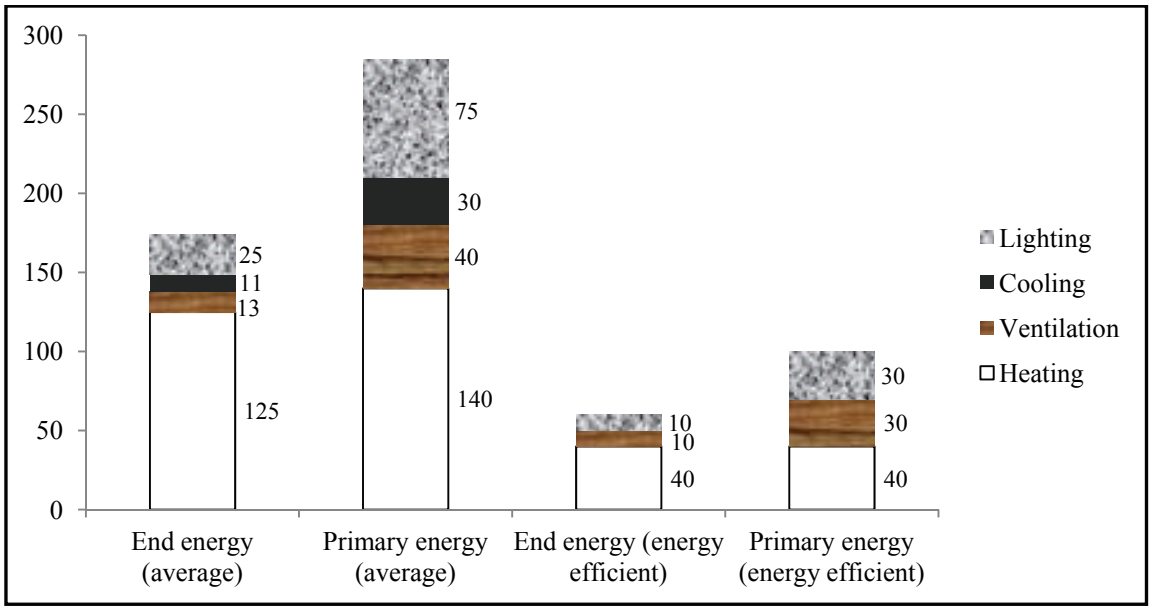
The documented and projected growth of the SRI agenda increasingly affects property companies, REITs and property funds searching for institutional capital. Property companies and funds that consider CSR will gain advantages in attracting investors and capital. Moreover, the rising adoption of SRI techniques by large investors may lead to a new form of SRI shareholder pressure. Institutional investors embracing SRI have the power to request and, if necessary, to instruct corporate executives to include environmental and social guidelines in their business objectives.[246] In this regard, some institutional investors have started to implement dedicated ESG policies related to their indirect real estate investments.[247] The recent commissioning of Maastricht University by three leading pension funds to conduct a survey to measure the extent to which property companies and funds integrate elements of environmental (risk) management into their investment process also reflects a growing desire to engage property investors on environmental issues.[248] Interest from institutional investors in sustainable indirect property investments has also prompted various property companies to launch dedicated green building funds, which invest solely in certified buildings.[249]

3.2.5 Energy Price Increases and Energy Efficiency Improvements

Rising energy costs have been another impetus for the real estate sector's increased attention to the sustainability agenda. As shown in Chapter 3.1.1, the property sector accounts for a significant proportion of natural resource consumption. The bulk of energy is consumed during the use phase of buildings.[250] Figure 11 provides a breakdown of average office building energy use in Germany. This figure shows that heating, ventilation, air-conditioning and lighting represent the main categories of energy consumption in office properties. Of these categories, space heating demand dominates overall energy consumption due to a high proportion of glazing and high air-exchange rates.[251] For the purpose of comparison, Figure 11 also depicts the energy use of a new, energy-efficient office building.

[244] Cf. Eurosif (2008), pp. 52 et seqq.
[245] Cf. RiskMetrics Group (February 2009), p. 1.
[246] Cf. Sparkes, R./Cowton, C. J. (2004), pp. 49, 50.
[247] Cf. PGGM Pension Fund (2010).
[248] Cf. Kok, N. et al. (2010), p. 4.
[249] Cf. IVG (2010); iii-investments (2009); Hines (2006).
[250] Cf. World Business Council for Sustainable Development (July 2008), p. 48.
[251] Cf. Voss, K. et al. (2005), p. 33.

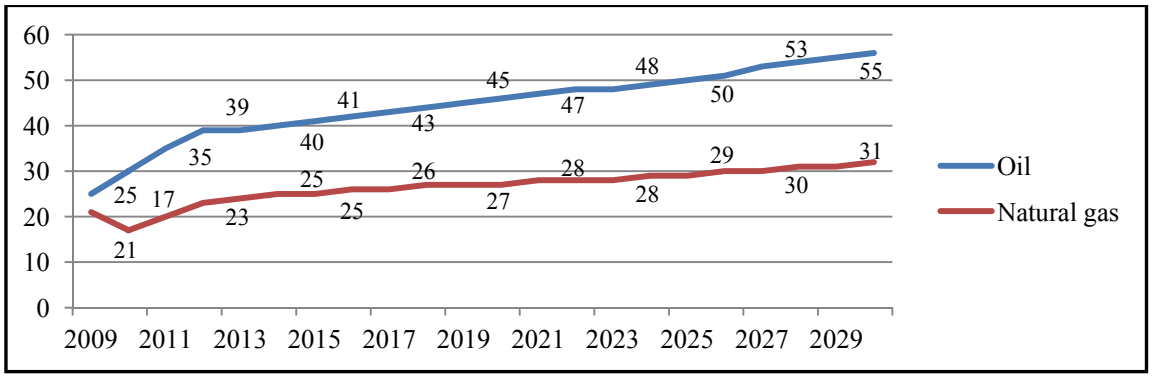
Figure 11: Energy consumption of existing stock versus energy-efficient properties



Source: Voss, K., et al. (2005), p. 33.

The types of energy consumed during the operation of buildings are primarily electricity, natural gas, fuel oil and district heat. As a result of increases in energy costs, particularly in 2007 and 2008, expenditures on energy now represent a significant fraction of real estate operating budgets.[252] For example, oil prices rose some 30% between 2004 and 2008.[253] Despite the recent abatement due to the worldwide recession, long-term forecasts predict the continuation of high energy prices. Figure 12 shows a generally accepted projection for oil and gas prices in Germany. Similarly, forecasts of electricity prices assume significant price level increases.[254]

Figure 12: Forecast of energy price increases in Germany in real terms



Source: Peter, F. (2009), p. 57.

[252] Cf. Jackson, J. (2008), p. 1; Cushman & Wakefield (August 2008), p. 9.
[253] Cf. Economy Watch (2010).
[254] Cf. Peter, F. (2009), p. 57.

Jones Lang LaSalle (2009) indicated that rising energy prices could result in higher operating costs for properties. For example, in Germany, the costs for heating and electricity in air-conditioned properties increased by 17% and 20%, respectively, between 2006 and 2009. In non-air-conditioned buildings, costs rose by 20% and 25%, respectively. Overall, these cost categories account for approximately 4-5% of total occupancy costs and 25% of total service charges.[255] Thus, energy cost histories of commercial spaces are increasingly accounted for in lease negotiations. A growing proportion of corporate occupants assume that rising energy costs will be the dominant factor that increases the importance of sustainability in the decision making of tenants.[256]

These considerations must be considered in the context of net lease contracts[257], which dominate the European property market, and studies indicating that tenants are not very concerned with operating costs. Accordingly, property investors consider mainly the impacts of rising energy prices on the operating expenses of common areas.[258] For these reasons, establishing the business case for energy-efficient properties solely on the basis of operational energy reductions is difficult.

Nonetheless, further increases in energy prices will reinforce their influence on property investors, as more energy-efficient buildings are added to the market and investments in energy efficiency become cost-efficient. Accordingly, rather than accepting rising energy costs as inevitable, investors holding buildings with high operational energy requirements must actively address energy costs and energy efficiency. Increased pressure to refurbish buildings to be more energy efficient, higher rates of depreciation and increased vacancy rates are eventually expected as a result of increasing energy prices.[259]

3.3 Corporate-Level Sustainability Drivers

3.3.1 Link between CSR and Competitive Advantage

Although the basic tenet of CSR is that society and business are interdependent, scholars struggle to specify the precise mechanism that links CSR to a company's financial perfor-

[255] Cf. Jones Lang LaSalle (September 2009); Eichholtz, P. et al. (2009) even show that energy costs account for 10% of the occupational costs in the U.S.A., see Eichholtz, P. et al. (2009a), p. 6.
[256] Cf. Jones Lang LaSalle (February 2008), p. 7.
[257] In a net lease the tenant is responsible for the costs of energy.
[258] For an in-depth discussion of the importance of energy costs for tenants, see Chapter 3.2.3.
[259] Cf. Jackson, J. (2008), p. 1; Sayce, S. et al. (2007), p. 634; Ellision, L./Sayce, S. (2007), p. 292; Pett, J. et al. (March 2005), p. 29.

mance. While some preliminary studies have indicated that companies adhering to CSR principles have superior financial performances, the source of these benefits and the ways in which CSR enables a company to achieve better operational results than its rivals are unclear.[260]

The most dominant theory linking CSR to a company's operational performance is derived from the resource-based view of the firm, which states that a company's ability to outperform its rivals depends on the combination of human, organizational and physical resources over time and the firm's capability of using these inputs more productively than its competitors.[261] Ultimately, this enhanced resource productivity and increased operational efficiency can create competitive advantages. In this regard, Porter and van der Linde (1995) argued that a company's CSR performance could be considered as a measure of the company's operational efficiency.[262]

In this context, properly designed environmental regulations are assumed to be the most important drivers for the continuous improvements, innovations and stakeholder integration that will finally lead companies to use resources more efficiently.[263] Many examples in which environmental legislation prompted some firms to innovate and gain competitive advantages while others made a stand against prospective legislation have been documented. These examples provide evidence that the costs of complying with regulations can be offset by productivity benefits from innovation. For example, 3M, which had to comply with new regulations to reduce solvent emissions, developed a method to avoid solvents altogether. The company was able to shorten the time to market of its products and to realize significant cost savings. 3M gained an early mover advantage in product development over competitors that later switched to solvent removal.[264] Another good example is that of the Japanese car manufacturers that started developing more efficient cars in response to a number of trends such as environmental legislation (e.g., increasing taxes on fuel) and economic necessities (rising oil prices). These companies have gained a considerable competitive advantage because of their innovative and forward-looking strategic orientation.[265] Such examples

[260] For an in-depth discussion of the CSR-financial performance link, see Chapter 2.1.
[261] Cf. Ireland, D. R. et al. (2009), pp. 16–17; Haberberg, A./Rieple, A. (2008), pp. 284 et seqq; Wernerfelt, B. (1984), p. 172.
[262] Cf. Porter, M./van der Linde, C. (1995), p. 130.
[263] Cf. Garriga, E./Mele, D. (2004), pp. 54 et seqq.; Russo, M. V./Fouts, P. A. (1997), pp. 536 et seqq.; Porter, M./van der Linde, C. (1995), pp. 121, 122; Hart, S. (1995), pp. 991 et seqq.
[264] Cf. Porter, M./van der Linde, C. (1995), pp. 126 et seqq.
[265] Cf. Sustainable Asset Management (SAM) Group (2009a), p. 13.

demonstrate that companies can reduce their impact on the natural environment with innovations and new designs of products, processes and methods of operation.

Although no such examples are available for the real estate sector, evidence is emerging that property companies are starting to perceive CSR as a source of competitive advantage. For example, property companies that are able to show that they make a positive contribution to society may more easily attract tenants, investors, new projects and employees. Moreover, property companies that embrace sustainability principles are expected to better demonstrate their commitment to their clients' values and, thus, to be able to realize competitive advantages within the marketplace.[266] Anecdotal evidence also suggests that companies that were first movers in providing green buildings were able to charge rent premiums.[267]

In summary, property companies operate in an external environment that increasingly emphasizes sustainability issues. Companies that respond to this challenge proactively by adopting CSR principles may have the opportunity to reap competitive advantages by using their resources more efficiently, focusing on a long-term business perspective and understanding how they relate to society and their competitive environment at large.[268] This paradigm weds environmental improvement with competitiveness. From this perspective, CSR is considered to be a proxy for good and innovative management skills.[269]

3.3.2 Link between CSR and Corporate Reputation

Because sustainability is an increasingly important priority for both businesses and the community, the consideration of CSR principles can result in image benefits at the corporate level. Addressing CSR allows companies to differentiate themselves from their competitors on the basis of their CSR commitments and, thus, to realize reputational benefits.[270] First, sustainable firms have an increased ability to attract and retain high-quality employees.[271] Second, an enhanced reputation can positively affect relationships with current and future stakeholders, such as investors, governments and suppliers.[272] Lastly, companies adhering to

[266] Cf. Jones, P. et al. (2009), pp. 530, 531.
[267] For further information on the effects of green building certification on property market values, see Chapter 3.4.
[268] Cf. Porter, M./van der Linde, C. (1995), pp. 133 et seqq.
[269] Cf. Guenster, N. et al. (July 2005), pp. 5–8.
[270] Cf. Kriese, U. (2009), pp. 460 et seqq.; DEGI Deutsche Gesellschaft für Immobilienfonds (2009), p. 4; Sustainable Asset Management (SAM) Group (2009a), p. 13; Davies, R. (2005), p. 20; Fombrun, C. et al. (2000), p. 85.
[271] Cf. Turban, D. B./Greening Daniel W. (1996), pp. 663 et seqq.
[272] Cf. KPMG (2009), p. 19.

CSR principles may be able to reap benefits because customers (tenants) are increasingly aware of sustainability issues.[273]

To create a positive corporate reputation, a rapidly increasing number of corporations across all industry sectors are using CSR reporting to communicate their environmental and social activities and performance to stakeholders. In a recent survey, KPMG (2009) concluded that CSR reporting had gone mainstream, with nearly 80% of the world's largest 250 companies issuing such reports and the rate of reporting for the entire sample of 2,200 companies reaching 45%.[274] However, companies' CSR reporting and publications are often criticized for failing to offer a coherent strategic framework for their CSR activities; rather, they compile anecdotes about separate activities to highlight a firm's social sensitivity.[275]

In the real estate industry, image benefits for marketing a building to investors or occupants can arise from the sustainability characteristics of an individual building and from the sustainable business practices and management operations of the company. A building's sustainability characteristics are of the utmost importance for fulfilling investors' and occupants' sustainability requirements. Further, a positive corporate image based on sustainable business practices may allow firms to reinforce the sustainability characteristics of its buildings. Moreover, sustainable business practices can address a customer's awareness of sustainability when an individual building does not feature specific sustainability characteristics.

Image benefits have been suggested to be drivers of sustainability in the real estate industry by Fuerst and McAllister (2008), Myers et al. (2008) and Lützkendorf and Lorenz (2007).[276] However, the number of articles providing empirical evidence is limited. Davies (2005) researched 12 case studies and reported that about half of the interviewees confirmed measurable image benefits emerging from the consideration of sustainability issues. Overall, respondents ranked an increased corporate image among the most important benefits offered by sustainable buildings and green investments.[277] The most prominent aspects for market-

[273] Cf. Creyer, E. H./Ross, W. T. (1997), pp. 428 et seqq.
[274] Cf. KPMG (2009), p. 13.
[275] Cf. Porter, M./Kramer, M. (2006), p. 2.
[276] Cf. Fuerst, F./McAllister, P. (June 2008), pp. 6, 23; Myers, G. et al. (2008), p. 312; Lützkendorf, T./Lorenz, D. P. (2007), pp. 652–655.
[277] Cf. Davies, R. (2005), p. 34.

ing sustainable buildings were a building's green features, maintenance efficiency, productivity gains and energy and cost savings.[278]

In addition to the marketing benefits of green buildings, property companies are increasingly documenting their environmental and social awareness and performance by publishing CSR and carbon disclosure reports. Such initiatives enable companies to publicly communicate their leadership role in the sustainability agenda. Newell (2008) found that Australia's leading property companies actively promoted their environmental performance via websites and CSR reports. Thus, they were able to gain considerable media exposure and capitalize on notable branding opportunities.[279] U.K. firms are also at the forefront of establishing green corporate images by extensively reporting on sustainability issues.[280] The most sustainable property companies receive additional image benefits through inclusion in major international sustainability indices.[281]

3.3.3 Link between CSR and Risk Management

Rising resource prices, tougher national and international environmental regulations and shifting investor and tenant demands are increasingly affecting the business environment in property investment and management. These sustainability aspects are now considered to be critical to the future success of property companies because their financial importance to real estate investors has grown significantly in recent years.[282] This trend has led stakeholders to demand improved risk management and better governance structures from companies. Conversely, for many companies, CSR is primarily a tool to manage the risks emerging from sustainability. The fact that risk management increasingly constitutes an internal corporate sustainability driver manifests in the overwhelming majority of CSR reports and corporate websites addressing the detailed link between sustainability and risk.[283] The increasing importance of sustainability for risk management is further influenced by external sustainability ratings, such as the Carbon Disclosure Project (CDP) and the FTSE4Good certification, which require companies to publicly report on the environmental and social risks associated with their business operations. Approximately 75% of companies in the CDP indicated that they had implemented risk-management procedures to mitigate environmental risks.[284] Moreover, institutional investors, particularly pension funds, increasingly demand climate

[278] Cf. Kriese, U. (2009), pp. 458 et seqq.
[279] Cf. Newell, G. (2008), pp. 536, 537.
[280] Cf. British Land (2009a); Hammerson (2009); Land Securities Group (2009).
[281] Cf. Sustainable Asset Management (SAM) Group (2009a); FTSE Group (2008).
[282] Cf. Carbon Disclosure Project (2010b), p. 3; Wood, D. (2009a), p. 3.
[283] Cf. Matten, D. (2007), pp. 403 et seqq.; Dixon, T. et al. (2008a), pp. 463, 464.
[284] Cf. Carbon Disclosure Project (2010b), p. 3; FTSE Group (2006), p. 3.

risk reporting by investee companies. For example, the U.S. Securities and Exchange Commission has been asked to require listed stock corporations to submit a report on climate-related risks.[285]

Numerous risks are associated with sustainability in the real estate sector. For example, regulatory risks can emerge when additional taxes arise from emissions and energy use and when tighter building regulations necessitate higher capital expenditures.[286] Physical risks for buildings may arise as a result of climate change and natural disasters, such as flooding and an increased demand on cooling due to heat waves. Shifting consumer demands may increase the depreciation of non-sustainable properties, and property owners may find themselves on the wrong side of a two-tiered real estate market that differentiates between lower-valued traditional buildings and higher-valued sustainable buildings.[287]

With regard to risk management improvements, the implementation of environmental management systems (EMSs) is considered to be an effective approach for mitigating a company's environmental risks.[288] An EMS is a management framework that outlines specific competencies, behaviors, procedures and demands for the realization of a company's environmental policy and for the achievement of its environmental objectives. EMSs support environmental risk management by ensuring that firms operate within the law and in line with their own policies. Popular EMSs are developed in accordance with the ISO 14001 standard.[289]

3.4 Expected Effects of Sustainability on Financial Indicators at the Property Level

3.4.1 Effects of Sustainability at the Rental Level

The business case to promote sustainable buildings requires reliable figures on the impact of sustainability on a property's cash flows. Hence, the rent premium connected to sustainable or certified properties is a key issue when considering the impacts of various sustainability drivers on the real estate market. The following analysis is divided into research that addresses the willingness to pay premiums for more sustainable buildings and research that provides empirical evidence of higher rent levels for sustainable buildings.

[285] Cf. Carbon Disclosure Project/Bundesverband Investment und Asset Management (2008), p. 15.
[286] See Chapter 3.2.1.
[287] Cf. UNEP Finance Initiative (2008a), p. 3; AtisReal (2008), p. 7; Pett, J./Ramsay, L. (2003), pp. 729, 734; see also Chapter 3.2.3.
[288] Cf. Rauschenberger, R. (2002), p. 136.
[289] Cf. Möller, J. (2007), p. 188.

Sayce et al. (2007) conducted three questionnaire surveys in 5-year intervals in the U.K. to study changes in the attitudes of institutional investors, valuation surveyors, property developers and property-investing banks toward sustainability issues in property markets. In each year, one third of the respondents believed sustainability issues affected rental levels, and 70-80% of the respondents expected sustainability issues to affect rental values in 5 years.[290]

Jones Lang LaSalle (2008) conducted a global survey of 400 corporate occupants' views on sustainable real estate. The results show that 70% of the respondents were prepared to pay a premium for sustainable real estate. The premium varied: 62% of respondents were prepared to pay a premium of 1-10%; 8% of respondents indicated a willingness to pay a premium higher than 10%; 30% were not prepared to pay a premium; and 4% expected to pay less for sustainable real estate.[291]

Similarly, the landlord and tenant surveys of Cushman and Wakefield (2007, 2009) clearly indicated a willingness to pay higher rents for environmentally efficient real estate. The 2007 survey reported the opinions of 825 senior executives, two thirds of whom were tenants. The results show that 45% of the tenants were willing to pay a rental premium for an energy efficient building.[292] The survey was updated in Europe in 2009, with a total of 750 tenants and landlords. In the 2009 study, the willingness to pay premiums decreased slightly, with 39% of the tenants prepared to pay a premium for an environmentally efficient building. Of the tenants willing to pay a higher rent, 55% were willing to pay a premium of 1-5%; 30% were willing to pay a premium of 6-10%; and 2% were willing to pay a premium higher than 10%.[293]

The only study that has exclusively focused on an occupant's willingness to pay in the German property market was conducted by Roland Berger Strategy Consultants (2010). By questioning 40 companies via online questionnaires, the authors found that occupants were prepared to pay a rent premium of 4.5% for certified space.[294]

[290] Cf. Sayce, S. et al. (2007), pp. 637, 638.
[291] Cf. Jones Lang LaSalle (February 2008), p. 5.
[292] Cf. Cushman & Wakefield (2007), p. 7.
[293] Cf. Cushman & Wakefield (Spring 2009), p. 11.
[294] Cf. Roland Berger Strategy Consultants (2010), p. 9.

The number of studies documenting higher rental levels for sustainable buildings is limited. Fuerst and McAllister (2008) investigated the effects of environmental certification on commercial real estate rents.[295] They used a hedonic regression analysis on U.S. commercial real estate asset data to analyze differences in asking rents between LEED- and Energy Star-certified buildings and non-certified buildings.[296] They used a sample of 24,479 office properties, of which 626 were LEED-certified and 1,282 were Energy Star-certified. The rent regression considered hedonic characteristics, such as age and metropolitan and submarket location.[297] The authors found that both types of certification exerted a significant positive influence on rent levels, and the size of the premium for both certification methods was approximately 4-5%. With regard to the LEED certification, a significant influence was observed only for LEED certified and platinum certifications.[298] The authors updated their research in 2009 and reported a rent premium of approximately 6% for certified properties. In contrast to their previous study, a significant positive influence of a LEED certification was observed only for LEED gold-certified premises.[299]

Wiley et al. (2009) studied the premiums associated with green design through regression analysis, controlling for location and lease type. They used data of 7,308 Class A office properties from the same data source used by Fuerst and McAllister (2008) and Eichholtz et al. (2008). The authors found that Energy Star- and LEED-certified properties had rent premiums of 7.3-8.9% and 15.2-17.3%, respectively. However, their hedonic model was limited in its ability to control for location. They identified rental and sale premiums for certified buildings relative to non-certified buildings in the same metropolitan area. However, certified buildings in more desirable locations could have had both location and certification premiums.[300]

[295] The majority of empirical studies (Fuerst and McAllister; Eichholtz et al.; Wiley and Benefield; Miller et al.) are based on data provided by the CoStar Group. Only Pivo and Fisher used alternative NCREIF data.
[296] The Energy Star program (jointly sponsored by the U.S. Environmental Protection Agency and the U.S. Department of Energy) began as a voluntary labeling program intended to identify and promote energy-efficient products and home appliances. The labeling program was extended to commercial buildings in 1999. Non-residential buildings can receive Energy Star certification if the source energy use of the building is among the top quarter of all comparable buildings; U.S. Department of Energy/U.S. Environmental Protection Agency (2010).
[297] The data sample that is actually used for the analysis of rent premiums only comprises 197 certified and 834 Energy Star certified properties.
[298] Cf. Fuerst, F./McAllister, P. (June 2008), pp. 21, 22.
[299] Cf. Fuerst, F./McAllister, P. (April 2009), p. 18.
[300] Cf. Wiley, J. A./Benefield, J. D. (2009), p. 12.

Pivo and Fisher (2009) used NCREIF quarterly data on U.S. office property returns from 1998 to 2008 to analyze the effects of sustainability (Energy Star certification, transit-oriented development and redevelopment areas) on different income components of property investments (e.g., NOI and total return). The overall sample consisted of 4,460 properties, of which 203 properties were Energy Star-certified and 4,257 were not certified. Their regression analysis results show that Energy Star properties had, on average, a 5.9% higher net income than non-certified buildings. The greatest proportion of this income was attributed to 4.8% higher rents. Properties near transit points in the suburbs and in central business districts (CBDs) had 12.7% and 4.5% higher net incomes, respectively. Properties in or near urban regeneration areas in CBD markets had 2.4% lower net incomes.[301]

Eichholtz et al. (2009) used a hedonic regression model to examine the effect of sustainability certification on the asking rents of a sample of 694 office buildings that were either LEED- or Energy Star-certified. Using GIS techniques, they controlled for location effects by identifying non-certified office buildings within a radius of 0.2 miles of each certified building. The total sample included 8,182 properties, and the rent level of a certified property was compared to the average level of 12 non-certified buildings. Moreover, their model controlled for differences in building quality, amenities, size and age. The authors identified a statistically significant rent premium on asking rent per square foot of 3.3% for Energy Star-certified buildings; LEED-certificated buildings had no rent premium. When measured in effective rents, which reflect the effect of different occupancy levels in the rental income of properties (nominal asking rent multiplied by the occupancy rate), the premium increased to approximately 10% and 9% for Energy Star-certified and LEED-certified buildings, respectively. However, the latter was not significant at conventional levels.[302] In 2010, the authors updated their research in two ways. First, they investigated the course of rents of their original sample of certified and non-certified buildings during the recent decline in property markets. Properties were compared based on 2007 and 2009 data. Eichholtz et al. (2010) concluded that the downturn in the real estate market and the simultaneous increase in green building supply had not significantly affected the returns of sustainable buildings relative to those of comparable high-quality investments. However, rent premiums decreased to 1.2% and 2.4% for nominal and effective rents, respectively. Second, the authors employed the same research design analogous to a larger sample of green buildings registered by October 2009. Holding the hedonic characteristics of the buildings constant, the

[301] Cf. Pivo, G./Fisher, J. (2009), p. 10.
[302] Cf. Eichholtz, P. et al. (2009b), p. 14.

results show 2% and 5% premiums for nominal and effective rents, respectively, in certified buildings.[303]

3.4.2 Effects of Sustainability on Operating Expenses

In addition to the rental level of properties, lower operating costs are often considered to be important in the promotion of sustainable buildings. Despite advances in real estate sustainability research, a limited number of studies analyzing the effects of sustainability on operating expenses have been conducted. In his pioneering study, Shiers (1999) analyzed the energy costs of 14 BREEAM-certified buildings by comparing data on the energy costs of green buildings to data from conventional buildings. The results show reductions in energy use and savings ranging from 6% to 30%. Due to the limited sample size, the author did not control for building age, design or functional characteristics.[304]

Kats (2003) examined the energy efficiency of 25 LEED-certified buildings and compared them to conventional buildings in California. The author also did not control for building age, design or functional characteristics. The results indicate that LEED-certified buildings were 25-30% more energy efficient on average.[305]

Miller et al. (2008) researched operating expenses based on the energy costs of 643 Energy Star-certified buildings and compared them to 2,000 non-certified buildings. Their results indicate cost benefits for certified buildings, with operating costs of $1.27 and $1.81 per square foot per year for Energy Star-rated and non-Energy Star buildings, respectively.[306]

Turner and Frankel (2008) found that their research sample of 121 LEED-certified properties used 25-30% less energy than non-LEED buildings on average, and the savings increased with the level of certification. However, the energy performance of individual buildings varied greatly, and the deviations between actual energy use and design projections were significant.[307]

[303] Cf. Eichholtz, P. et al. (April 2010), pp. 11, 16.
[304] Cf. Shiers, D. (2000), p. 359.
[305] Cf. Kats, G. (2003), pp. 19 et seqq.
[306] Cf. Miller, N. et al. (2008), p. 387; the authors used the following filters to develop the comparison sample: (1) only Class A office buildings, (2) 200,000 square feet or more, (3) five stories or more, (4) built since 1970, and (5) multi-tenanted.
[307] Cf. Turner, C./Frankel, M. (2008), p. 13.

Pivo and Fisher (2009) analyzed the operating costs of 203 Energy Star-certified and 4,257 non-certified buildings and detected significantly lower utilities expenses for the Energy Star-certified properties. These properties saved approximately 9.8% on utilities compared to non-certified buildings.[308]

3.4.3 Effects of Sustainability on Risk

The perceived risk of an investment can arise from many factors. Decreased risks in sustainable buildings are typically a result of either a lower risk of future obsolescence or a lower risk of vacancy. The case for lower risks of future obsolescence, or "future-proofing", stems from the risks associated with non-green buildings as sustainable properties become mainstream.[309] These risks arise from legislative and market requirements and materialize in, for example, higher costs for retrofitting non-sustainable properties and increased penalties for gas emissions and energy consumption. These risks are difficult to evaluate, but the AtisReal survey of the property industry in the U.K. provides some insight. In the survey of 125 respondents, 60% of respondents expected that sustainable property would form an asset class in the future; 54% of respondents expected that investing in sustainable property would greatly reduce investment risks; and most respondents believed that sustainable property would be easier to sell or rent.[310]

The case for lower vacancy rates is based on the expectation that sustainable properties already carry less risk of vacancy. Fuerst and McAllister (2009) applied a hedonic regression model, which controlled for differences in age, size, height, building class and submarket, to investigate occupancy rate differences between certified and non-certified properties. The authors reported 8% and 3% higher occupancy rates for LEED-certified and Energy Star-certified properties, respectively.[311] Their findings are similar to those of Miller et al. (2008), who detected 5% and 4% higher occupancy rates for LEED and Energy Star offices, respectively.[312] Wiley et al. (2009) analyzed the effects of Energy Star and LEED certification on the vacancy rates of properties. Their results show that certification had a positive impact on the occupancy level of properties; compared to the control group, vacancy rates were 10.2-11.0% and 16.2-17.9% lower for Energy Star and LEED properties, respectively.[313]

[308] Cf. Pivo, G./Fisher, J. (2009), p. 12.
[309] Cf. Fuerst, F./McAllister, P. (June 2008), p. 8; Jones Lang LaSalle (February 2008), p. 6; Cushman & Wakefield (August 2008), p. 2; Sayce, S., et al. (2007), p. 634; Pramerica Real Estate Investors (November 2007), p. 4; Pett, J. et al. (November 2004), p. 8.
[310] Cf. AtisReal (2008), p. 7.
[311] Cf. Fuerst, F./McAllister, P. (2009), p. 58.
[312] Cf. Miller, N. et al. (2008), pp. 388, 390.
[313] Cf. Wiley, J. A./Benefield, J. D. (2009), p. 11.

Pivo and Fisher (2009) used NCREIF data to analyze 203 Energy Star-certified and 4,257 non-certified properties. The authors found that Energy Star-certified properties had lower vacancy rates than non-certified properties. However, the actual difference in vacancy rates (0.9%) was notably smaller than that observed by studies using CoStar data.[314]

3.4.4 Effects of Sustainability on Property Values

The impacts of sustainability issues on rent, operating costs and risks exert an influence on property values. In addition to these cash flow-related factors, the supply and demand for green buildings in the real estate market affects the pricing of properties. The willingness of landlords to pay a price premium for sustainable real estate was documented in the surveys of Cushman & Wakefield (2007, 2009), in which 47% of landlords in 2007 and 44% of landlords in 2009 stated their willingness to pay a price premium at purchase.[315] Similarly, Roland Berger Strategy Consultants (2010) found that investors in the German property market were prepared to pay an 8.9% premium for sustainability certified buildings.[316]

Sayce et al. (2007) conducted a series of three questionnaire surveys at 5-year intervals that asked respondents to indicate when they thought sustainability would start to affect investment yields. In 1995, more than 40% of respondents believed that sustainability already affected investment yields, and 80% believed that yields would be affected within the following 5 years. In the 2000 survey, the figures were at the same levels. Surprisingly, in the 2005 survey, only 23% of respondents felt that environmental factors affected investment yields, and 70% assumed that the effect would start within 5 years. The authors suggested that the change might reflect the competitiveness of the U.K. investment market in 2005.[317]

Only a few research papers have empirically investigated the pricing of sustainable properties. Miller et al. (2008) studied the impacts of LEED and Energy Star certification on property prices. Their hedonic regression model controlled for differences in age, size and location (city and CBD) between their sample of certified buildings (927 total: 643 Energy Star and 284 LEED) and a much larger sample of non-certified buildings. The authors found a

[314] Cf. Pivo, G./Fisher, J. (2009), p. 10.
[315] Cf. Cushman & Wakefield (Spring 2009), p. 11; Cushman & Wakefield (2007), p. 7.
[316] Cf. Roland Berger Strategy Consultants (2010), p. 10.
[317] Cf. Sayce, S. et al. (2007), p. 637; for further details on the study setup see Chapter 3.4.1.

9.94% price premium for LEED-certified buildings and a 5.76% price premium for Energy Star buildings.[318]

Wiley et al. (2009) considered the relationship between energy-efficient design and the sales market for commercial real estate in 46 office markets across the U.S.A. Using a hedonic pricing approach, the authors found price premiums of $29.71/ft. for Energy Star-certified properties and $129.18/ft. for LEED-certified buildings.[319]

Fuerst and McAllister (2008) used a hedonic regression framework to evaluate the selling price premiums of 626 LEED-certified and 1,282 Energy Star-certified properties compared to 24,479 non-certified properties. To control for differences between the certified and non-certified buildings, the authors included a number of control variables such as age, size, height, location, lease type, building class and submarket. Their results show a 26% price premium for LEED buildings and a 25% price premium for Energy Star buildings.[320] In a 2009 update of this study, the authors found premiums for LEED and Energy Star certification of 35% and 31%, respectively.[321]

Research by Eichholtz et al. (2009) on selling prices and market values of green buildings was based on a sample of 199 green buildings sold between 2004 and 2007. The selling prices and building characteristics of certified and sold buildings were compared to 694 nearby non-certified properties. The results of the regression models reveal 16% higher selling prices for certified properties. Investigating the effects of LEED and Energy Star certification separately showed a substantial 19% sale price premium for Energy Star-certified buildings, but no statistically significant sale price premium was observed for LEED-certified buildings.[322] In 2010, the authors updated their research by employing the same research methodology to a larger sample of certified buildings registered by October 2009. Their results show that certified buildings sell for a premium of approximately 13% compared to otherwise identical buildings.[323]

[318] Cf. Miller, N. et al. (2008), p. 391; for further details on the study setup see Chapter 3.4.2.
[319] Cf. Wiley, J. A./Benefield, J. D. (2009), p. 11; for further details on the study setup see Chapter 3.4.1.
[320] Cf. Fuerst, F./McAllister, P. (June 2008), p. 23; for further details on the study setup see Chapter 3.4.1.
[321] Cf. Fuerst, F./McAllister, P. (April 2009), p. 21; for further details on the study setup see Chapter 3.4.1.
[322] Cf. Eichholtz, P. et al. (2009b), p. 20; for further details on the study setup see Chapter 3.4.1.
[323] Cf. Eichholtz, P. et al. (April 2010), p. 17; for further details on the study setup see Chapter 3.4.1.

Pivo and Fisher (2009) used NCREIF data to determine the effect of sustainability on property market values. Energy Star certification, transit-oriented development and investment and building location in redevelopment areas were defined as sustainability benchmarks. Their analysis suggested that Energy Star-certified buildings had 13.5% higher market values, transit-oriented properties in suburbs had 16.2% higher market values, transit-oriented properties in CBDs had 10.4% higher market values and properties in or near urban regeneration areas in CBDs had 1.1% higher market values compared to the control sample of non-sustainable properties.[324]

3.4.5 Effects of Sustainability on Construction Costs

The initial additional investment required for the construction of sustainable or green properties and the potential of associated benefits to outweigh the additional costs are important factors. The number of empirical studies on actual cost levels is limited and typically based on case studies. Among the pioneering studies is research by Shiers (1999), who analyzed the construction costs of 13 buildings in the U.K. using information provided by project managers or from available project reports. The author concluded that of the 13 properties, nine were constructed with costs comparable to conventional buildings, whereas two buildings had construction costs lower than conventional buildings, and two had construction costs higher than conventional buildings.[325]

Kats (2003) investigated the construction costs of 33 LEED-certified properties, of which 25 were office buildings and 8 were school buildings. Information for this study was collected primarily by interviewing architects, senior building personnel, members of California's Sustainable Building Task Force, USGBC staff and members of the Green Building Valuation Advisory Group. The author identified an overall cost premium of approximately 2%. Buildings with bronze (8 properties), silver (18 properties), gold (six properties) and platinum (one property) LEED ratings had average cost premiums of 1%, 2.1%, 1.8% and 6.5%, respectively.[326]

Steven Winters Associates (2004) examined the costs of greening new federal properties. Their research focused on federal courthouses and office buildings. Instead of using real building costs, the study was based on a comparison of standard building prototypes modi-

[324] Cf. Pivo, G./Fisher, J. (2009), p. 11; for further details on the study setup see Chapter 3.4.1.
[325] Cf. Shiers, D. (2000), p. 360.
[326] Cf. Kats, G. (2003), p. 12.

fied to reflect different LEED ratings. Altogether, 12 building scenarios were developed for the two different building types. The authors concluded that LEED silver buildings could be constructed at a cost increase of less than 2.5%. Depending on the targeted LEED level, the construction cost estimates for new green buildings varied between a 0.4% reduction and an 8.1% increase. Cost premiums for renovating and achieving the various LEED ratings ranged from 1.4% to 7.8%. Without exception, higher LEED levels increased costs.[327]

Matthiessen and Morris (2004) studied the cost premium of LEED certification by comparing the construction costs of 45 LEED-certified properties to 93 similar non-certified buildings. The research sample consisted of libraries, laboratories and academic classrooms. The final results show that construction costs for LEED buildings were scattered throughout the range of costs for all the buildings studied, without any apparent pattern of distribution. The analysis of the sample variation also indicated no statistically significant difference between the construction costs of LEED properties and non-LEED properties.[328] In 2007, the authors applied the same methodology to a new data sample of 83 certified buildings and 138 non-certified buildings. The building types analyzed included libraries, laboratories and academic buildings, community centers and ambulatory care facilities. The results of the previous analysis were confirmed, as no construction cost premium was observed for certified properties.[329]

By investigating a sample of 22 office buildings, Voss et al. (2005) showed that the energy consumption of new office premises could be reduced by 50% compared to conventional buildings without increasing construction costs. Primary energy use was limited to 100 kWh/m²a for most of the buildings studied.[330]

Although these studies indicated a relatively small cost premium, market participants generally overestimate likely cost premiums. Research conducted by the WBCSD (2008) showed that a 17% premium was perceived as necessary to construct a "sustainable certified" building. Estimates ranged from 17% in Germany and 12% in France to 16% in the U.S.A.[331]

[327] Cf. Steven Winter Associates (2004), p. 18.
[328] Cf. DAVIS LANGDON (2004), p. 18.
[329] Cf. DAVIS LANGDON (2007), p. 4.
[330] Cf. Voss, K. et al. (2005), p. 35.
[331] Cf. World Business Council for Sustainable Development (July 2008), p. 35; the research investigated perceptions of building sustainability across eight countries. Therefore, 1,434 people (architects, journalists,

Similarly, results by Jones Lang LaSalle (2008) suggested that 70% of corporate occupants assumed that sustainable properties cost up to 10% more than conventional buildings.[332]

3.5 Section Summary

The preceding sections analyze the fundamentals of sustainability in the real estate sector. The emphasis is on determining and examining the drivers for sustainability from a real estate investor's point of view. This exercise is a prerequisite for developing a real estate-specific sustainability management framework because the proposed strategies and mechanisms must specifically address the sustainability drivers relevant to property investment and management. In this context, tougher national and international regulations, shifting tenant and investor demands triggered by the evolution of new market standards and rising energy prices have been identified as the most important sustainability aspects influencing the future performance of property portfolios. The in-depth analysis of sustainability drivers revealed a lack of research in various areas. In particular, tenant leasing behaviors and tenant needs and demands in sustainable buildings are largely unexplored. Though there is one preliminary paper by Eichholtz et al. (2009) for the U.S. market, the European property market has not yet been researched. Similarly, corporate-level sustainability drivers have mostly been neglected in academic real estate research.

Evaluating the consequences of the increased importance of sustainability issues is difficult. The financial impacts of sustainability at the corporate and portfolio levels have not been studied. For individual buildings, empirical studies have provided preliminary information on the price relationships between certified and non-certified properties. However, their generalizability and explanatory power are limited. In particular, most of the studies used small data samples and were based on the U.S. CoStar dataset. These issues present two limitations. First, other markets, such as the ones in Europe or Australia, are not represented. Second, studies have only analyzed Energy Star and LEED properties, and because other assessment tools have different requirements and emphases, the generalizability of the results to green buildings with other certifications is questionable. In addition, the observed premiums seem to depend strongly on model specifications; models with more factors yield lower rent and price premiums. In relation to the aforementioned empirical studies, Muldavin (2008) indicated that peer selection was often narrowly focused on macro-level

academics, regulators, policy-makers, analysts, financiers and property investment companies) were interviewed using a telephone questionnaire between November 2006 and February 2007.

[332] Cf. Jones Lang LaSalle (February 2008), p. 5.

attributes, which do not take into account issues such as property size and tenant mix.[333] The stability of these findings should also be considered. The previous studies drew conclusions over a fairly limited time period, which was characterized by increasing sales prices, as noted by Muldavin (2008). The increased price levels require the selection of comparable sales from a narrow timeframe, and studies should consider general price increases.[334] The second question worth asking is whether the price premiums are a permanent phenomenon or an indication of the current shortage of sustainable properties offered in the transactions market, as reported by Pivo (2007). In this context, Fuerst and McAllister (2009) have shown in a theoretical model that future long-term price effects are contingent on technological progress, market penetration rates and regulation, all of which are difficult to predict. Hypothesizing economies of scale in green building production and an increasing market share of certified products, the authors concluded that the price premium of certified properties would decline in the future. Reasons that are supposed to undermine the price premium include both supply-side factors, such as the decreasing construction costs, and demand-side factors, such as the diminishing image benefits as certified space becomes the norm.[335] These considerations are supported by Jones Lang LaSalle (2008), who stated that as sustainability issues become more embedded in the property stock, inefficient buildings with poor sustainability performances would suffer discounts, and assets that demonstrate leadership will command top rental levels.[336]

Similar limitations apply to studies documenting the construction costs of sustainable buildings. These studies typically use varying numbers of case studies, which restricts their generalizability. Moreover, many case studies are based on public buildings, such as schools and laboratories, which are not common investment products for real estate investors. The heterogeneity of buildings also limits the generalizability of results in a market and across markets with different building codes, standards and practices. Except for the study by Shiers (1999), all studies of the construction costs of sustainable buildings are from the U.S.A.

Altogether, the effects of sustainability on the cash flows of companies and properties are arguable and difficult to assess. Similarly, evaluating or ranking the future importance of drivers is nearly impossible. For example, legislative requirements could be tightened by

[333] Cf. Muldavin, S. R. (2010), p. 83.
[334] Cf. Muldavin, S. R. (2010), p. 83.
[335] Cf. Fuerst, F./McAllister, P. (June 2008), p. 8.
[336] Cf. Jones Lang LaSalle (February 2008), p. 6.

governments with emissions trading schemes that cover the property sector. Because of increasingly strict building regulations, tenant requirements could be enhanced as more sustainable properties enter the property market. For this reason, large property investors must go beyond investments in certified sustainable properties and implement a holistic set of management procedures that account for a multitude of current and future sustainability aspects. A strategic approach that focuses solely on investing in certified properties is impractical due to the limited number of certified properties and the large investment volumes of institutional property investors. In addition, this approach does not consider the existing building stock portfolio in which the greatest potential for improving sustainability performance in the real estate sector lies. Likewise, the majority of sustainability drivers strongly influence standing property investments. These facts require property investors to develop a broad range of strategies and tools for addressing the sustainability agenda across their entire portfolio. Properly embedding sustainability strategies and mechanisms in a company's regular and established business operations is an important prerequisite for the successful consideration of the sustainability agenda in property investment and management processes and for the realization of sustainability benefits.

4 Conception of a Sustainable Property Portfolio Management Framework

The previous chapters show that the increasing importance of sustainability is changing the property investment and management landscape. On one hand, sustainability issues impact the perception of, and the requirements, on properties and thus influence a building's ability to compete in future markets. On the other hand, firms' sustainability strategies and management capabilities are expected to exert a great influence on property companies' future performance.

A comprehensive sustainability approach in property portfolio management has to embrace all activities contributing to increasing the value of property portfolios. The CSR literature reviewed in Chapter 2 reveals, however, that the definition of a sustainability-oriented company and the determination of relevant strategies, tools and measurement is still in its infancy, particularly in the real estate sector.[337] The conception of a comprehensive sustainable property portfolio management framework necessitates the adaptation and the supplementation of the traditional property portfolio management model illustrated in Chapter 2.2. In a first step, the following section draws on four different sources to determine appropriate strategies and mechanisms for "greening" property portfolios. First, the previous academic literature is surveyed. Second, CSR indices and their assessment criteria are scrutinized to identify requirements on companies from a third-party sustainability rating point of view. Third, CSR reports of the most sustainable property companies are analyzed to gather information on their leaders' activities. Last, initiatives introduced by non-governmental organizations to support the dissemination of sustainability are investigated. Because of the research focus of this dissertation, solely CSR issues that directly influence the sustainability performance of property portfolios are included in the following analysis. On the basis of this analysis, Chapter 4.2 is dedicated to developing the structure of a sustainable property portfolio management framework. Finally, Chapter 4.3 investigates barriers that have prevented property investors from embracing sustainability practices more actively.

[337] For an in-depth discussion of CSR, see Chapter 2.1; see also Jones, P. et al. (2009), p. 524; Pivo, G. (2009), p. 483.

4.1 Identification of Sustainability Practices for Property Portfolio Management

4.1.1 Proposed Sustainability Schemes in the Academic Literature

Previous academic research represents the starting point for identifying potential sustainability strategies and mechanisms to adapt traditional property portfolio management procedures. It is noteworthy that the available academic research is very limited in particular with regard to the real estate industry.

In the academic management literature, various researchers, including Szekely and Knirsch (2005), Brown and Fraser (2006) and Xie and Hayase (2007), have tried to identify strategies and practices that may characterize good CSR management. Their research results can provide a useful foundation, albeit the authors did not investigate the property industry and thus did not address the specific circumstances of the real estate sector. Key components of all prior work can be summarized as follows:[338]

- adoption of strategic objectives, e.g., eco-efficiency, and the development of a sustainability policy statement including objectives, the corporation's understanding of sustainability and the recognition of the company's environmental and societal impacts;
- identification of key performance indicators (e.g., environmental performance metrics such as energy consumption and water use);
- collection of data for the indicators through a formalized information system;
- monitoring of environmental and social performance indicators and benchmarking against past performance, peers and stated objectives; and
- external reporting of the company's sustainability initiatives, including activities, objectives and results

In comparison to overall academic management research, there are very few notable academic papers explicitly dedicated to analyzing sustainable investment and management practices in the real estate sector. In their pioneering work, Rapson et al. (2007) examined sustainability policies, practices and products of ten large multi-asset investment organizations in the U.K. The authors particularly aimed to find relationships between longer established equities SRI activities and potential RPI practices. To identify examples of sustainable property investment and management, Rapson et al. (2007) drew on publicly available

[338] Cf. Xie, S./Hayase, K. (2007); Brown, J./Fraser, M. (2006); Szekely, F./Knirsch, M. (2005).

company literature. RPI practices employed by each organization were identified and classified, resulting in 11 separate milestones for RPI (see Table 5).[339]

Table 5: RPI activities identified by Rapson et al. (2007)

Milestones	Examples of RPI activities
Independent auditing/benchmarking	➢ External audits of environmental management systems and/or aspects of sustainability performance (e.g. ISO 14001, Carbon Trust, Urbed) ➢ Participant in externally managed benchmarking activity (e.g. "PEG" by Upstream)
Environmental management policy	➢ Statement containing: recognition of impacts on environment; objectives; planned/ongoing actions
Energy/water/waste/emissions monitoring	➢ Systems in place to monitor and improve investment property performance in at least one of: energy/water consumption; waste production/recycling; emissions to air/land/water
Engagement with tenants	➢ Discussion of above areas (related to tenant activity) with the aim of improving tenants' performance
Environmental assessment	➢ Use of environmental assessment criteria or tools (e.g. EIA, BREEAM) for new purchases, new developments, or refurbishments
RPI policy	➢ Statement explicitly mentioning RPI, or that links SRI and property, or that discusses property activities under the heading of SRI
Environmental reporting	➢ Publication of environmental and/or sustainability performance of investment properties at least annually
Environmental design	➢ Specification of low environmental impact/non-hazardous materials in new developments ➢ Specifying energy efficiency/waste management criteria ➢ Aiming for flexibility in building use
Use of renewable electricity	➢ Sourcing of electricity supplies for all/some investment properties from "green" energy suppliers
Improving surrounding area	➢ Work undertaken to improve communities in the vicinity of some investment properties (e.g. eradicating vandalism, nature conserva-
RPI fund	➢ A retail/institutional property investment fund with explicit RPI objectives/characteristics

Source: Rapson, D. et al. (2007), p. 351.

In a second paper, the same authors reviewed reporting protocols of activities relating to CSR, SRI and Corporate Governance (CG) of the five best-performing companies in their first study. Here, the emphasis was on exploring the scope and boundaries of these concepts and determining whether identified practices had to be classified as CSR, SRI or CG. The study found significant variation in the way U.K. property companies defined and used these terms. To summarize and structure their results, identified RPI practices were arranged according to a property company's managerial areas of responsibility, consisting of construction, procurement, property management, community investment, property investment, and governance. The following table gives the details of the companies' activities and their classifications. Because the dissertation emphasizes the property portfolio perspective, only selected CSR activities identified by Rapson et al. (2007) and Roberts et al. (2007) (highlighted in bold) are relevant for the following analysis.[340]

[339] Cf. Rapson, D. et al. (2007).
[340] Cf. Roberts, C. et al. (2007), p. 394.

Table 6: RPI activities identified by Roberts et al. (2007)

Theme	Activities
Construction	➢ **Inform contractors and consultants of environmental policy and encourage them to operate similar standards** ➢ **Specify preference for materials with low environmental impact across life cycle** ➢ **Aim to produce buildings with good environmental performance (specifically energy)** ➢ **Make best use of land available** ➢ **Engage with stakeholders to understand their aspirations and concerns** ➢ **Ensure compliance with environmental legislation, codes of practice and agreements to which company subscribes** ➢ **Employ sustainable construction techniques to lessen environmental impact/protect reputation as responsible corporate citizen/ strengthen business in the eyes of existing and potential customers** ➢ **Waste management: Recycling (i.e. use concrete crushers on site)** ➢ **Waste management: disposal of hazardous waste carefully**
Procurement	➢ **Assess environmental performance of largest suppliers** ➢ **Avoid use of hazardous materials** ➢ **Seek to use materials from sustainable sources** ➢ **Treat suppliers fairly and ensure they are paid within agreed timescale** ➢ **Communicate SEE strategy and minimum expectations to suppliers** ➢ **Set out minimum requirements regarding human rights and equal opportunities to suppliers** ➢ **Select suppliers and products which comply with ethical best practice, taking into account cost** ➢ **Question suppliers regarding CSR** ➢ **Promote green supplier award** ➢ **Develop supplier screening tool according to CSR principles**
Property Management	➢ Own offices: low energy lighting/passive infrared controls (PIC)/ flat computer screens for energy efficiency/ carpets with recycled content/recycled furniture from previous premises/low VOC paint/bike racking/motorcycle parking/video-conferencing facilities ➢ Own offices: Annual review of water usage ➢ Own offices: minimize waste and recycle where possible ➢ Own offices: engage with carbon trust ➢ **Investment properties: ISO14001/EMAS for all properties** ➢ **Investment properties: program for auditing major environmental and socio-economic impacts, monitoring and continuous improvement** ➢ **Investment properties: engage with relevant stakeholders to reduce waste where possible** ➢ **Investment properties: Seek to influence energy consumption of occupants** ➢ **Maintain local habitats and ecosystems**
Community Investment	➢ Published research paper doesn't contain information in this section
Governance	➢ Professional development and training opportunities for employees ➢ Do not discriminate: gender, race, ethnicity, religion, sexual orientation, age or physical disability ➢ Employees turnover 20% ➢ 0 accidents, H&S fines or upheld complaints ➢ Employee consultation forum ➢ Funding for trade union reps ➢ Internal and external communication of CR issues ➢ Payment of fees to professional bodies for employees ➢ Work life balance initiative
Property Investment	➢ Published research paper doesn't contain information in this section

Source: Roberts, C. et al. (2007), p. 396.

Together, the studies by Rapson et al. (2007) and Roberts et al. (2007) provide a summary of sustainability mechanisms applied by a limited number of U.K. investment companies. In this way, the authors were able to determine which sustainability issues U.K. property firms attach importance to. However, they neglected to develop a strategic framework that outlines the process of implementing sustainability in property portfolio management. Rather, they simply aggregated a random set of sustainability activities. In addition, Rapson et al. (2007) and Roberts et al. (2007) did not aim to capture interdependencies with already established management procedures because they did not analyze the detailed arrangement and mode of operation of the identified sustainability mechanisms.

Similar to the methodology of Rapson et al. (2007) and Roberts et al. (2007), Newell (2008) drew on CSR reports to investigate the sustainability practices of Australian listed property trusts. The author used content analysis for screening public domain documents such as annual reports, corporate sustainability and responsibility reports and carbon disclosure reports. The scope of investigation of the study was restricted to environmental sustainability issues, excluding the other sustainability dimensions. Therefore, sustainability practices were identified in the fields of corporate strategy, sustainability disclosure, environmental performance targets, supply chain screening and tenant engagement. On the basis of this categorization, isolated examples of companies' sustainability practices were randomly cited. The study does not comprise a systematic investigation of companies' sustainability approaches. Besides evaluating the identified sustainability mechanisms in isolation from the firms' business activities, the author omitted any analysis of the identified sustainability practices in greater detail.[341]

Further research on RPI strategies and mechanisms was conducted by Pivo (2008). In a first paper, the author prioritized and ranked 66 sustainability criteria by making use of the Delphi Method. The list of available criteria was drawn from existing literature and amended by suggestions from survey participants. Aside from identifying the most important property investment and management mechanisms that pertain to the RPI agenda, the author applied factor analysis to categorize the criteria into ten underlying sustainability dimensions. Pivo (2008) did not differentiate the indicators according to whether the criterion described a

[341] Cf. Newell, G. (2008).

characteristic of a property or of a property owner. Table 7 provides an overview of the most important RPI practices identified in this study.[342]

Table 7: RPI practices identified by Pivo (2008)

Sustainability dimensions	Sustainability criteria
Energy conservation	➢ **Energy efficiency, daylight and ventilation, renewable energy, locally sourced materials**
Environmental protection	➢ **Water conservation, recycling, low contributions to global warming, use of sustainable building materials, wildlife habitat, trees, wetlands, ozone, historic/cultural, native plants, runoff, ridges and views, eco-restoration,** public art
Credentialing	➢ **EPA (government) partner, green certified building,** no SRI pariah tenants, SRI mortgagee
Less auto dependent	➢ **Transit-oriented development, transit level of service, central location, dense mixed use and walkable, carpooling, bike trails and fa-**
Urban revitalization and adaptability	➢ **Benefits urban revitalization, flexibility to adapt to changing uses, catalyses positive suburban or peripheral development, brownfield and infill, not on prime farmland**
Health and safety	➢ **Property and visitor security, low risk of injury, low risk from natural hazards**, gyms/showers, evacuation/aid training, first aid equipment, health and safety signage, visitor insurance
Worker wellbeing	➢ **Open space, parks and plazas nearby, sense of community and place, childcare, accommodations for disabled, amenities for work-**
Corporate citizenship	➢ **Regulatory compliance, disclosure and reporting, engagement with suppliers**
Social equity and community development	➢ **Community relations and development, stakeholder engagement, solicits community input during development,** affordability, fair labor practices, union construction and service workers, local low-income hiring and training, promotes diversity, respect for indigenous people, philanthropy and volunteering
Local citizenship	➢ **Aesthetics, fit, visual blending and quality public realm, minimum local impacts,** no involuntary displacement, considerate construction, no undue influence with local government

Source: Pivo, G. (2008b), pp. 26 et seqq.

All of the listed issues belong to the field of RPI. Of these, however, only few are relevant for the following research because the scope of the dissertation is restricted to strategies and mechanisms for embracing sustainability in the management of existing property portfolios. Activities that are sustainable due to their intrinsic environmental or social characteristics, such as investments in affordable housing, are not included in the following. They represent autonomous business models and are not appropriate for the adaptation of existing portfolio management processes. Sustainability practices that are important within the research focus of this dissertation are highlighted in bold (see Table 7). Overall, Pivo (2008) compiled a broad range of potential RPI activities. However, they are examined as disconnected from property companies' business operations. Similar to the aforementioned studies, this research approach has led to the absence of a strategic framework that outlines the specific steps for introducing sustainability into property portfolio management.

[342] Cf. Pivo, G. (2008b), pp. 26 et seqq.

In a second paper, Pivo (2008) identified RPI practices employed by companies that engaged in the UNEP Finance Initiative's Property Working Group.[343] Examples of the use of sustainability mechanisms by individual companies were compiled for each of the ten sustainability dimensions established in the author's previous work. This paper intends to randomly gather RPI activities rather than provide a systematic comparative evaluation of the sustainability policies and achievements of the leading companies.[344]

Further indications for the adaptation of traditional property portfolio management procedures can be inferred from the survey by Kok et al. (2010) on the environmental sustainability practices of real estate companies. The authors conducted an online questionnaire survey consisting of 43 questions to assess the environmental performance of property companies against the environmental benchmark formulated by the three sponsoring pension funds. In this way, a sample of 198 property investment companies (72 listed companies and 126 private funds) was examined.[345] The survey is divided into two main sections. The first category—Management & Policy—includes questions on the environmental policy of the respondents, the integration of environmental criteria into asset management and the external reporting of environmental policies. The second category—Implementation & Measurement—deals with the certification of the existing and recently acquired properties, the actual energy consumption and staff training. Overall, albeit with the notable exceptions of Australia, Sweden and the U.K., the authors detected a very low level of environmental sustainability of intermediate property investors.[346] The results reveal that 67% of the respondents neither had environmental sustainability policies nor implemented environmental practices. Another 21% performed well on the Management & Policy section but did not execute the policies equally well. Only 10% of the responding companies set ambitious environmental targets and also implemented corresponding measures. When trying to explain variations in environmental performance between the property companies, company size, percentage of closely held shares and financial performance were identified as statistically significant parameters.[347] For German listed property companies, the survey results are disappointing. First, only two out of eight companies responded to the survey. Second, the respondent companies

[343] Gary Pivo is the academic advisor to the UNEP FI Property Working Group. For this reason, their recommendations and findings are closely connected to his research.
[344] Cf. Pivo, G. (2008a).
[345] Overall, 198 out of a total of 688 property investment companies and funds responded to the survey. The response rate is unevenly distributed, being higher in Europe and Australia in comparison to the US and Asia.
[346] The results of the study are given in appendix 9.
[347] Cf. Kok, N. et al. (2010).

attained very low levels of environmental sustainability. In general, this survey gives valuable insights into property companies' RPI practices. However, it relies solely on written questionnaires, with no validation of respondents' answers. In addition, the authors were unable to clarify their questions in cases where the respondents required further information. Furthermore, the survey is directed exclusively at gathering information on the applications of sustainability practices, omitting the investigation of their detailed arrangements and modes of operation. For this reason, Kok et al. (2010) were unable to scrutinize interdependencies and overlaps of a company's sustainability management with its established management procedures.

In contrast to researching the consideration of sustainability in existing property portfolios, Schäfer et al. (2008, 2009) examined the opportunities of dedicated sustainability property investment vehicles. The emphasis of this research is on the evaluation of the marketability of specialized sustainability property funds. The authors also marginally analyzed possibly applicable sustainability mechanisms. They concluded that both the quality of management practices and the quality of buildings are of major importance. Preset minimum environmental and social standards in the property acquisition due diligence, certification of properties, sustainability reporting and third-party verification of RPI practices were ascertained as decisive factors. It is worth noting that this study only identifies these tools and does not investigate them in detail.[348]

Altogether, there is scant academic literature on real estate-specific sustainability management procedures. In addition, the existing studies highlight scientific research has only recently begun to emerge. The lack of academic research accompanies the absence of a robust, comprehensive and normative framework for the consideration of sustainability in property portfolio management. Existing academic papers identify a broad range of sustainability mechanisms. However, they are generally determined in isolation from companies' business strategies and business operations. Consequently, the previous literature lacks a coherent strategic framework outlining the process and specific steps for the implementation of sustainability in property portfolio management. Moreover, the majority of researchers focus solely on identifying sustainability mechanisms, neglecting to investigate their arrangements and modes of operation. In addition, all studies rely on publicly available company reporting or written questionnaires. This shortcoming leads most researchers to neglect the capture of

[348] Cf. Rohde, C./Lützkendorf, T. (2009); Schäfer, H. (2008).

interdependencies and overlaps of companies' sustainability management mechanisms with longer established management procedures.

4.1.2 Sustainability Standards in Third-Party CSR Ratings

In response to investors' increasing interest in evaluating the CSR performance of companies in which they invest, financial advisory firms have developed sustainability indices and ratings.[349] By attracting considerable publicity, sustainability indices and ratings can affect corporate behavior. Their influence on companies is reflected in, for example, 266 companies improving their environmental management practices when the FTSE4Good environmental inclusion criteria were strengthened.[350] The most prevalent sustainability indices are the Dow Jones Sustainability Indices (DJSI) and the FTSE4 Good indices. The most important sustainability rating agency is RiskMetrics Group. In the following, their assessment methodologies are analyzed in detail to capture the requirements of investors and third-party CSR assessments for a sustainability-oriented company. Further sustainability indices and ratings, although less important, are provided by KLD (KLD 400 Social Index)[351], Bank Sarasin Rating, SIRIS Research, Vigeo, Bureau Veritas, IMUG (Institut für Markt-Umwelt-Gesellschaft) and Oekom Research.

Sustainable Asset Management Group (SAM) – Dow Jones Sustainability Index

SAM Group, in cooperation with Dow Jones Indexes and STOXX Limited, developed the Dow Jones Sustainability Index family (DJSI). It consists of global, European, North American and Asian indexes as well as subsets of customized benchmark indexes. SAM Group's first sustainability index, the Dow Jones Sustainability World Index, was launched in 1999.[352]

DJSI indexes are designed to track the performance of the top listed companies in terms of CSR. Here, constituent companies from an underlying starting index are assessed according to the Corporate Sustainability Assessment methodology developed by SAM Group (see Table 8). Sustainability index constituent companies are then selected by a best-in-class approach. For this purpose, companies must reach certain minimum levels of CSR performance and be among the top 10% within their specific industry group.[353] The assessment

[349] For an in-depth discussion of investors' increasing interest in the CSR performance of investee companies, see Chapters 2.1, 3.2.4.
[350] Cf. FTSE Group (2004), pp. 1, 2.
[351] KLD was acquired by RiskMetrics Group in June 2009.
[352] Cf. Sustainable Asset Management (SAM) Group (2009b).
[353] Cf. Sustainable Asset Management (SAM) Group (2009c), p. 4.

methodology rests upon the application of a large number of assessment criteria to examine corporations' management of opportunities and risks emerging from economic, environmental and social issues. These criteria consist of both general criteria applicable to all industries and specific sector criteria and cover all three sustainability sections (economic, environmental and social dimensions). General criteria account for approximately 45% of the assessment. Specific industry criteria constitute another 55% (see Table 8). Assessment criteria are derived by SAM Group following the identification of global and industry sustainability challenges.[354] Data to assess companies' CSR performance are collected by employing a variety of tools. The most crucial sources of information are company questionnaires distributed to all companies and publicly available company documentation (e.g., sustainability reports, annual financial reports).[355]

In contrast to SAM Group, whose assessment approach covers all aspects influencing a company's CSR performance, the dissertation at hand only investigates CSR aspects that affect the management of property portfolios. Criteria that are considered relevant for the conception of a sustainable property portfolio management framework are highlighted in bold.

Table 8: Sustainability assessment criteria used by SAM Group

Criteria	Weighting (%)	Sub-Criteria
Economic Dimension	**26.2%**	
General Criteria		
Corporate Governance	6.0%	➢ Structure: Board size ➢ Board structure ➢ Non-Executive Chairman/Lead Director ➢ Responsibilities and Committees ➢ Transparency Corporate Governance policy ➢ Conflict of Interest External Auditor ➢ Diversity: Gender ➢ Board Effectiveness ➢ Entrenchment provisions ➢ Transparency of Senior Management ➢ Remuneration
Risk & Crisis Management	**6.0%**	➢ **Responsibility Risk & Crisis Management** ➢ **Uniform Risk Analysis** ➢ **Definition of Risk** ➢ **Risk Map** ➢ **Sensitivity Analysis & stress testing** ➢ **Risk response strategy**
Codes of Conduct/ Compliance/ Corruption & Bribery	5.5%	➢ Codes of Conduct: Focus ➢ Codes of Conduct: Systems/Procedures ➢ Corruption and Bribery Policy: Scope and Business Relationships ➢ Breaches Codes of Conduct: Public Reporting

[354] Cf. Sustainable Asset Management (SAM) Group (September 2009a), pp. 9 et seqq.
[355] Cf. Sustainable Asset Management (SAM) Group (September 2009a), p. 12.

Industry Specific Criteria		
Stakeholder Engagement		➢ Criteria are not publicly disclosed
Environmental Dimension	**40.1%**	
General Criteria		
Environmental Performance (Eco-Efficiency)	7.0%	➢ **Key Performance Indicators (KPI) – Energy** ➢ **KPI – Greenhouse Gas Emissions** ➢ **KPI – Waste** ➢ **KPI – Water** ➢ **Coverage**
Environmental Reporting	3.0%	➢ **Content: Qualitative, e.g. on material indirect/direct environmental issues; quantitative, e.g. key performance indicators, targets** ➢ **Assurance** ➢ **Coverage**
Industry Specific Criteria		
Biodiversity		➢ Criteria are not publicly disclosed
Building Materials		➢ Criteria are not publicly disclosed
Climate Change Strategy		➢ Criteria are not publicly disclosed
Environmental Policy/ Management System		➢ Criteria are not publicly disclosed
Operational Eco-Efficiency		➢ Criteria are not publicly disclosed
Resource Conservation and Resource Efficiency		➢ Criteria are not publicly disclosed
Social Dimension	**33.7%**	
General Criteria		
Human Capital Development	5.5%	➢ Human resource skill mapping & developing process ➢ Human Capital performance indicators ➢ Personal and organizational learning & development
Talent Attraction & Retention	5.5%	➢ Coverage of employees through predefined performance appraisal process ➢ Percentage of performance related compensation ➢ Balance of variable compensation based on corporate and individual performance ➢ Corporate Indicators for performance-related compensation ➢ Type of individual performance appraisal ➢ Communication of Individual performance to upper management ➢ Payout type of total performance-related compensation ➢ Trend of employee satisfaction ➢ Additional benefits
Labor Practice Indicators	5.0%	➢ KPIs & Reporting: Diversity & discrimination ➢ KPIs & Reporting: Equal remuneration ➢ KPIs & Reporting: Freedom of association ➢ KPIs & Reporting: Layoffs ➢ KPIs & Reporting: Health & safety ➢ Grievance resolution ➢ Public commitment
Corporate Citizenship/ Philanthropy	3.5%	➢ Measuring the results of contributions ➢ Philanthropy/Social investment volume
Social Reporting	3.0%	➢ Content: Qualitative, e.g. on material societal, labor related issues; quantitative, e.g. key performance indicators on workforce, suppliers, community ➢ Assurance ➢ Coverage
Industry Specific Criteria		
Social Integration		➢ Criteria are not publicly disclosed

Standards for Suppliers		➢ Criteria are not publicly disclosed

Source: Sustainable Asset Management (SAM) Group (September 2009a), p. 10; Sustainable Asset Management (SAM) Group (2009a), p. 69.

Table 8 shows that the SAM Corporate Sustainability Assessment takes a broad range of sustainability issues into account. The assessment criteria allow companies to derive the most important sustainability issues that have to be addressed if they seek to consider sustainability in their management procedures and business operations. With regard to property portfolio management, the most important sustainability issues are those analyzed in the environmental dimension. At this juncture, SAM Group's assessment methodology considers both performance-oriented (e.g., KPIs energy, CO_2, water and waste) and management-oriented (e.g., the consideration of biodiversity and the use of environmental management systems) sustainability management aspects. However, the primary purpose of SAM Group's CSR assessment is the analysis of a great number of companies. Hence, it does not outline strategies and mechanisms to actually manage the relevant sustainability issues in a company's day-to-day operations. Altogether, SAM Group's CSR assessment criteria show which sustainability themes firms have to address but do not describe the manner in which they ought to be addressed.

The most recent results of the SAM Corporate Sustainability Assessment demonstrate a very low level of CSR performance within the real estate industry. The poor environmental performance of the assessed companies indicates that many real estate companies have not yet begun to realize the destructive financial implications of climate change and corresponding initiatives. The following table summarizes assessment results from 2009.[356]

Table 9: Sustainability assessment results of the real estate industry sector (SAM Group)

Dimension	Average Score	Best Score	Weighting
Economic	54%	89%	26.2%
Environmental	27%	75%	40.2%
Social	31%	80%	33.7%

Source: Sustainable Asset Management (SAM) Group (2009a), p. 69.

As of September 21, 2009, there were 109 property companies in the underlying starting index for the Dow Jones Sustainability World Index. From these eligible companies, 16 en-

[356] Cf. Sustainable Asset Management (SAM) Group (2009a), p. 69.

terprises are currently member of the DJSI World. The starting universe for the DJSI STOXX comprises 19 companies, 5 of which are sustainability index members.[357]

FTSE - FTSE4Good Index Series

In 2001, the FTSE Group launched the FTSE4Good Index Series.[358] It comprises benchmark indices covering the Global, U.S. and European regions, as well as the FTSE4Good Environmental Leaders Europe 40 Index. To assess companies' CSR performance, FTSE works in association with the Ethical Investment Research Service (EIRIS). The universe of companies eligible for inclusion in the FTSE4Good Index Series is drawn from the FTSE All Share Index or the FTSE Developed Index.[359] To qualify for inclusion, companies have to meet a broad range of criteria in the following fields:

- working towards environmental sustainability;
- developing positive relationships with stakeholders;
- up-holding and supporting universal human rights;
- ensuring good supply chain standards; and
- countering bribery[360]

In each assessment section, CSR requirements for companies are contingent on their industry sector's exposure to risk in this specific field of sustainability. For example, the environmental sustainability assessment methodology classifies industry sectors into high-, medium- and low-impact sectors depending on their environmental footprint. Thereby, property investors are assigned to the low-impact group and property developers to the medium-impact group.[361] On the contrary, the real estate sector is not subject to requirements in the assessment sections ensuring good supply chain labor standards and countering bribery because these elements are regarded to be of little importance in the property industry. To identify and determine assessment criteria, FTSE draws on extensive market consultation and independent expert committees. For assessing a company's CSR performance, FTSE, like SAM Group, relies heavily on scrutinizing publicly available company documentation and stakeholder commentary as well as questionnaires that are sent to companies.[362] Table 10 provides an overview of FTSE4Good assessment criteria for measuring the CSR perfor-

[357] Cf. Sustainable Asset Management (SAM) Group (September 2009b); Appendix 10 provides an overview of property companies that are constituents of DJSI.
[358] FTSE Group is a world leader in the creation and management of equity, bond and alternative asset class indices.
[359] Cf. FTSE Group (2008).
[360] Cf. FTSE Group (2006), p. 1.
[361] Besides investing in existing properties, real estate investment companies often engage in property development. Table 10 depicts the assessment methodologies for both categories.
[362] Cf. FTSE Group (2006), p. 1.

mance of real estate sector companies. Criteria that have to be taken into account in the development of a sustainable property portfolio management framework are highlighted in bold.[363]

Table 10: Assessment criteria used by FTSE Group

Criteria	Indicators/Factors
Working towards environmental sustainability	
Policy	
Low Impact Companies: Companies must have published a policy statement including one commitment indicator Medium Impact Companies: Policy must cover the whole and meet four indicators, three of which must be core	**Core Indicators:** ➢ **Policy refers to all key issues** ➢ **Responsibility for policy at boards or department level** ➢ **Commitment to use of targets** ➢ **Commitment to monitoring and audit** ➢ **Commitment to public reporting** **Desirable Indicators:** ➢ **Globally applicable corporate standards** ➢ **Commitment to stakeholder involvement** ➢ **Policy addresses product or service impact** ➢ **Strategic moves towards sustainability**
Management	
Low Impact Companies: No requirements Medium Impact Companies: EMS must cover one third of the company and meet four indicators. ISO 14001 certified or EMAS registered systems are considered to meet all six indicators	➢ **Presence of environmental policy** ➢ **Identification of significant impacts** ➢ **Documented objectives and targets in key areas** ➢ **Outline of processes and responsibilities, manuals, action plans and procedures** ➢ **Internal audits against the requirements of the system not limited to legal compliance** ➢ **Internal reporting and management review**
Reporting	
Low Impact Companies: No requirements Medium Impact Companies: No requirements	**Core Indicators:** ➢ **Text of environmental policy** ➢ **Description of main impacts** ➢ **Quantitative data** ➢ **Performance measured against targets** **Desirable Indicators** ➢ **Outline of an EMS** ➢ **Non-compliance, prosecution, fines, accidents** ➢ **Financial dimensions** ➢ **Independent verification** ➢ **Stakeholder dialogue** ➢ **Coverage of sustainability issues**
Developing positive relationships with stakeholders	
Policy	➢ Adopting an equal opportunities policy and/or including a commitment to equal opportunities or diversity in their annual report or website ➢ Adopting a Code of Ethics or Business Principles
Management	➢ Providing evidence of equal opportunities systems including one or more of: monitoring of the policy and workforce composition, flexible working arrangements, more than 10% of managers being women ➢ Providing evidence of health and safety systems including one or more of: Awards, details health and safety training, published accident rates ➢ Providing evidence of training and employee development systems including one or more of: annual training reviews for staff, providing significant data on time and money spent on training

[363] Cf. FTSE Group (2006), p. 3.

	➢ Providing evidence of systems to maintain good employee relations including union recognition agreements or other consultative arrangements
Reporting	➢ One of the following: Making charitable donations, operating payroll giving schemes, providing gifts in kind or staff secondments to community schemes
Up-holding and supporting universal human rights	
Policy Companies with significant involvement in countries with the greatest human rights concern are required to meet human rights criteria. Significant involvement is defined as having 1000+ employees or GBP 100 m in turnover or assets in these countries. Amongst countries of concern are China and Saudi Arabia	➢ A public statement of commitment to respect all the ILO core labor standards globally. Alternatively signatories to the UN Global Compact or SA 8000, or whose states support for the OECD Guidelines for Multi-national Enterprises are considered to meet this requirement ➢ The strategic responsibility for the human rights rests with one or more board members or senior managers ➢ A clear statement of support for the Universal Declaration of Human Rights ➢ Communication of the human rights policy to employees globally
Management	➢ Monitoring the implementation of its human rights policy including the existence of procedures to remedy any non-compliance ➢ Training for employees globally in its human rights policy ➢ Consulting with independent local stakeholders in the countries of concern ➢ Evidence of a human rights impact assessment which includes the company identifying the major human rights issues it faces and integrating human rights into its risk assessment procedures
Reporting	➢ No requirements
Ensuring good supply chain labor standards	
Policy	➢ No requirements for real estate sector
Management	➢ No requirements for real estate sector
Reporting	➢ No requirements for real estate sector
Countering bribery	
Policy	➢ No requirements for real estate sector
Management	➢ No requirements for real estate sector
Reporting	➢ No requirements for real estate sector

Source: FTSE Group (2006), p. 3.

Table 10 reveals that the FTSE4Good rating does not outline or identify detailed sustainability issues within the main sustainability sections. Moreover, its assessment methodology is not customized to single industry sectors. Therefore, it focuses mainly on the evaluation of companies' strategic procedural approaches to managing CSR. The lack of detailed, industry-specific sustainability criteria limits the explanatory power of their assessment results. Above all, the FTSE4Good assessment does not control whether companies address the most important sustainability issues that they actually face. This approach leads companies to be able only to derive specific strategic steps for the implementation of sustainability management strategies and mechanisms.

Comparing the Dow Jones Index family to the FTSE4Good Index series reveals some striking differences in their methodologies. The Dow Jones Sustainability Index family is based

on a positive screening and best-in-class approach, resulting in the limitation of the index to companies that perform best in the CSR arena. In contrast, the FTSE4Good Index series draws on a positive and negative screening framework. In this way, all companies fulfilling the FTSE4Good requirements qualify for inclusion. In contrast to the SAM Group rating, this methodology does not require direct comparison of companies' CSR performances.[364]

Intangible Value Assessment (IVA) - RiskMetrics Group

RiskMetrics Group is a world leader in the field of risk research. At this juncture, the company also focuses on linking sustainability and finance by identifying non-traditional sources of risk.[365] RiskMetrics Group conducts a broad range of different sustainability assessments, such as the Intangible Value Assessment (IVA), Climate Change Risk Management, Social Issues Services, and Compliance Screening. In-depth analyses of companies' environmental, social and strategic governance performances form the basis of its CSR research and consulting services. In the following, the IVA methodology is examined in greater detail as it represents the most important tool of RiskMetrics Group in the sustainability area. [366]

The IVA methodology aims at evaluating a company's CSR performance by assessing its managerial and financial capacities to manage risks and to seize opportunities posed by environmental and social issues. RiskMetrics Group measures company performance across four distinct areas – Strategic Governance, Human Capital, Stakeholder Capital and Environment – and investigates more than 120 performance indicators.[367] Key components of the process of surveying a company's CSR performance are an in-depth sector analysis, collection of publicly available company publications and company interviews. In this regard, RiskMetrics Group tries to actively communicate with the company to be assessed.[368] Table 11 gives an overview of the assessment criteria used in the IVA framework.[369] Because the present dissertation emphasizes the property portfolio perspective, only selected criteria highlighted in bold are relevant for the development of a sustainable property portfolio management framework.

[364] Cf. FTSE Group (2006), p. 1; see also Chapter 3.2.4.
[365] In 2009 RiskMetrics extended its financial dominated research perspective by acquiring Innovest Strategic Value Advisors and KLD Research & Analytics. Both were leaders in the fields of sustainability risk research and consulting.
[366] Cf. RiskMetrics Group (2010b).
[367] Cf. RiskMetrics Group (2010c).
[368] Cf. ibid.
[369] Cf. RiskMetrics Group (2010a).

Table 11: Intangible Value Assessment framework (RiskMetrics)

Strategic Governance	Human Capital
Strategy Scanning Capability	Employee Motivation & Development
Strategic Capability & Adaptability	Labor Relations
Traditional Governance Concerns	Health & Safety
Intellectual Capital & Product Development	
Product Safety	
Stakeholder Capital	**Environment**
Partnerships with Stakeholders	**Risk Management Systems including Board and Management Oversight**
Relationships with Host Communities	**Disclosure and Verification**
Management of Supply Chains	**Efficient Use of Resources**
Emerging Market Strategies	**Effective Waste Management and Reduction**
Operations at Risk of Human Rights Abuses	**Climate Risk Management**
	New Product Development

Source: RiskMetrics Group (2010c); RiskMetrics Group (2010a).

The IVA methodology represents a comprehensive CSR assessment framework that examines both strategic procedural aspects of managing CSR (e.g., the existence and use of environmental risk management systems and the introduction of disclosure) and companies' performances in specific sustainability themes (e.g., efficient use of resources and effective waste reduction). Thus, its assessment criteria allow companies that seek to implement sustainability management procedures to determine the most important fields of interest. Similar to the DJSI and FTSE4Good assessment methodologies, the IVA rating does not intend to outline strategies and mechanisms for managing sustainability in a company's day-to-day business operations.

Besides the IVA methodology, the RiskMetrics Group provides Climate Change Risk Management assessment services. This tool aims to help investors and asset managers evaluate and compare investee companies' abilities to respond to emerging climate change issues. For this purpose, companies' carbon-driven financial and competitive risks and value opportunities are measured by investigating their management and disclosure practices. The field of carbon finance is currently attracting heightened attention as increasingly more countries introduce emissions trading schemes.[370] The Climate Change Risk Management assessment consists of the Climate Change Governance and the Carbon Risk Exposure framework.[371]

[370] For an in-depth discussion of the increasing importance of ETSs, see Chapter 3.2.1.
[371] Cf. RiskMetrics Group (November 2009); the assessment frameworks of both schemes are shown in appendix 11 and appendix 12.

This section provides an in-depth analysis of the assessment methodologies of the most prevalent CSR ratings. Their assessment criteria are widely accepted as sustainability standards, as shown by the many companies actively working towards meeting their sustainability requirements. Nevertheless, these sustainability ratings are often subject to criticism.[372] First, their assessment criteria and the weights of criteria vary widely. This variation has prevented the emergence of one widely accepted CSR framework and causes confusion among companies and investors. Second, the aforementioned CSR ratings are criticized for tending to use assessment criteria for which data are readily and inexpensively available, even though they may not be good proxies for CSR. Third, even if measures are chosen accurately to reflect firms' CSR performances, the data are frequently unreliable. Most ratings rely on surveys and self-reported company data that have not been verified externally. Finally, the CSR ratings lack transparency. Although the investment firms were responsive in helping to establish a general understanding of their assessment methodologies, it was impossible to obtain further information on more detailed aspects of their assessments (e.g., industry-specific assessment criteria). Irrespective of this criticism, the aforementioned CSR ratings represent an important source of information for the present dissertation for the following reasons: the publicity that they attract, their prevalence in the market and the very limited amount of academic research. The primary purpose of these CSR ratings is the analysis of a great number of companies. For this reason, their assessment methodologies do not intend to outline strategies and mechanisms for managing the relevant sustainability issues in a company's day-to-day business operations. However, they allow companies that seek to implement sustainability management procedures to derive the most important sustainability issues that must be addressed.

4.1.3 Sustainability Issues in Property Companies' CSR Reporting

Previous CSR research in the real estate sector indicates overall poor CSR performance of property companies.[373] However, some outstanding exceptions exist. In particular, firms from the U.K. and Australia seem to outperform their peers in other countries and to deliver the best practice examples of integrating sustainability measures into their business operations. In the following section, their CSR agendas are examined in detail to identify sustainability strategies and mechanisms that the best-performing property companies have implemented. On the basis of research results by Kok et al. (2010), SAM Group (2009) and Bank

[372] Cf. Porter, M./Kramer, M. (2006), p. 3; Chatterji, A./Levine David (2006).
[373] Cf. Kok, N., et al. (2010), p. 6; Sustainable Asset Management (SAM) Group (2009a), p. 69.

Sarasin (2009), CSR initiatives by British Land, Hammerson, Land Securities, Stockland and Investa Property Group are selected for an in-depth analysis.[374]

Similar to the studies by Newell (2008) and Rapson et al. (2007),[375] this chapter draws on publicly available company documentation, such as CSR reports and corporate websites, to investigate the CSR practices of property firms. The portfolio management approach devised in Chapter 2 (Table 3) forms the analytical assessment framework to systematically identify, categorize and evaluate companies' CSR practices. Previous research lacks such a predetermined assessment scheme. In prior research, companies' CSR activities are investigated in isolation from business activity, and the identified CSR practices are not connected to established portfolio management activities. Because the dissertation at hand emphasizes the property portfolio perspective, the following analysis is limited to CSR issues that directly affect the performance of property portfolios. CSR issues such as human resources (e.g., equal opportunities, diversity and human rights), corporate governance and philanthropy are excluded from the following considerations.[376]

Strategic and Organizational Aspects

Analysis of the aforementioned property firms' CSR initiatives reveals that each surveyed company explicitly acknowledges the impact of sustainability on its business. This mindset results in strong CSR commitments. The seriousness of their approach to CSR is reflected in statements such as Land Securities' assertion that "…we believe good C(S)R practices make for a stronger business and it is therefore essential that C(S)R is embedded in everything we do and how we do it."[377] Similarly, Hammerson describes the importance of sustainability by declaring "….a strong C(S)R strategy is fundamental to the strength of our business. We therefore recognize the importance of integrating our C(S)R strategy into our overall business and risk management framework."[378] Similar predications can be found in the CSR

[374] Cf. Kok, N., et al. (2010), p. 24; Sustainable Asset Management (SAM) Group (2009a), p. 69; Sarasin Bank AG (September 2009), p. 16; Results of these studies are discussed in Chapter 4.1.1 and 4.1.2.
[375] Cf. Newell, G. (2008); Rapson, D., et al. (2007); For an in-depth discussion of these papers see Chapter 4.1.1.
[376] Appendices 13 to 17 provide detailed analysis of the CSR reports of the surveyed companies.
[377] Cf. Land Securities Group (2009), p. 9; Land Securities uses the term Corporate Responsibility (CR) to describe its sustainability initiative. Similar to CSR, the term CR is used in competing and overlapping ways. One prevalent definition understands CR as consisting of the three pillars of CSR in addition to Corporate Governance and Corporate Citizenship; see UNEP Finance Initiative (2008b), p. 4. The dissertation at hand excludes both Corporate Governance and Corporate Citizenship as neither is directly linked to the property portfolio level.
[378] Cf. Hammerson (2009), p. 1.

documentation of all surveyed companies.[379] To underpin their CSR commitments and to strengthen the implementation of CSR issues in their businesses, all companies devised and adopted formal CSR policies.[380] CSR policies represent the basis for each company's CSR approach and outline key CSR issues, CSR targets and opportunities evolving from sustainability. The most important issues recurring in all CSR policies are the environment (climate change, energy and resource use), stakeholder engagement (customers, community) and supply chain management. Health and safety and investor issues seem to be of less importance as only Land Securities explicitly includes these issues in its CSR model.[381] To detect key corporate sustainability challenges and to ensure that the company's CSR policy addresses the most important issues, Hammerson and Stockland conduct an organizational materiality analysis. The results of this research form the foundation for both companies' CSR policies.[382]

Apart from the determination of material CSR issues, all companies emphasize the importance of clearly outlining and communicating annual and long-term CSR targets to avoid "greenwashing" and to translate policies into business operations. Regarding the former, all companies define performance-based targets, in particular relating to reductions in energy use, CO_2 emissions, waste recycling and water consumption. These performance-based annual targets are regularly supplemented by a set of strategic and management-oriented annual targets pertaining to, for example, the development of sustainability toolkits and guidance material. When setting long-term targets, Hammerson and Land Securities more heavily focus on strategic issues such as the implementation of certain policies (procurement policy or integration of sustainability aspects in acquisition process). In contrast, British Land, Stockland and Investa primarily pursue performance-based long-term goals. For this purpose, they have set performance benchmarks for energy use, water use and waste to be achieved in a three- to five-year timeframe.[383]

To formalize and continuously improve their CSR management procedures, surveyed companies have begun to appoint CSR committees, CSR teams or dedicated working groups. At

[379] Cf. British Land (2009a), p. 4; Stockland (2009a), p. 2; Investa Property Group (2010b).
[380] Cf. Hammerson (2010a); Land Securities Group (2010); British Land (2010c); Stockland (2009a); Investa Property Group (2010b).
[381] Cf. British Land (2009a), p. 5; Hammerson (2009), p. 6; Land Securities Group (2009), p. 6; Stockland (2009a), p. 12; Investa Property Group (2009b).
[382] Cf. Stockland (2009a), p. 13; Hammerson (2009), p. 6.
[383] Cf. British Land (2009a), p. 60; Hammerson (2009), p. 65; Land Securities Group (2009), p. 40; Stockland (2009a), p. 43; Investa Property Group (2009c).

this juncture, the allocation of tasks varies across the surveyed companies. At Stockland, the responsibility to set strategic long-term goals and to define policies rests with a CSR committee headed by a board member. Dedicated working groups and teams are charged with transposing the policy into business operations and day-to-day management. The majority of surveyed companies (e.g., Hammerson, Land Securities and Investa Property Group), however, consolidate both activities into one CSR working group. The organization of CSR working groups and teams differs only slightly among companies. These groups are mostly composed of dedicated employees tasked with implementing CSR practices in business operations as well as employees representing different operational corporate departments (e.g., British Land, Hammerson and Land Securities).[384] By introducing a centralized corporate division and at the same time forming cross-functional teams, the surveyed companies rely on a combination of organizational modes to manage sustainability. The organization of the CSR implementation shows that all companies are realizing the integration of CSR practices via a top-down management approach.

In addition to the adaptation of the corporate organization, all surveyed companies display high engagement with industry bodies such as regional Green Building Councils and regional property associations.[385] By strengthening collaboration with sector peers, the companies aim to develop solutions for advancing sustainability and CSR in the real estate sector. Among all industry initiatives, participation in the UN Principles for Responsible Investment and the Carbon Disclosure Project (CDP) constitutes the highest commitment to CSR as they require companies to adhere to specific principles.[386] Signatories to the UN Principles for Responsible Investment are Stockland, Investa and Hammerson. Contributory companies to CDP are Stockland, Hammerson, Land Securities and British Land.[387]

Risk Management

Sustainability issues such as tighter environmental regulation, increasing energy prices and changing user requirements present significant risks to real estate investors.[388] This risk is reflected in all investigated companies' establishing a link between their CSR initiatives and risk mitigation as well as embracing CSR activities to ensure sustained long-term financial

[384] Cf. British Land (2009a), p. 6; Hammerson (2009), p. 7; Land Securities Group (2009), pp. 6, 21.
[385] Cf. British Land (2009a), p. 42; Land Securities Group (2009), p. 28; Stockland (2009a), p. 21; Investa Property Group (2010d).
[386] Both initiatives are discussed extensively in Chapter 4.1.4.
[387] Cf. Carbon Disclosure Project (2010e); Stockland (2009a), p. 21; Investa Property Group (2010d); Hammerson (2010b).
[388] See Chapter 3.3.3.

success. In this context, ever-changing environmental legislation is seen as the most crucial piece of risk, with companies extensively exploring risks evolving from regulation.[389] Overall, the most comprehensive CSR risk analysis is conducted by CDP participants. Companies taking part in this initiative are required to comprehensively consider regulatory, physical and other risks of climate change and to implement formal processes to identify and properly manage these risks.[390]

To strengthen the management of CSR risks in day-to-day business operations, all surveyed companies have introduced some kind of environmental management system (EMS). Using EMSs ensures that companies operate within the law and in line with their policies and targets. Land Securities is the only company to have an ISO 14001-certified system in place for the management of its existing assets.[391] British Land uses an ISO 14001-certified EMS to ensure the proper consideration of environmental issues in its property developments.[392]

Measurement and Monitoring

The investigation of the companies' CSR approaches further reveals that the majority of activities relate to improving the sustainability performance of property portfolios by reducing resource use and CO_2 emissions. For this reason, all companies highlight the importance of measuring and monitoring environmental performance data at the portfolio level as well as at the property level. Measured performance data regularly comprise energy use, CO_2 emissions, recycled waste and water consumption. Recent CSR efforts of surveyed companies mainly pertain to increasing the breadth and accuracy of these data.[393] For this purpose, most companies have developed specialized tools to gather and analyze environmental performance data as well as to support benchmarking.[394] The Climate Change Action Plan tool developed and implemented by Stockland represents one of the most sophisticated such tools. It allows for collecting and monitoring data, defining emission reduction targets and determining costs associated with achieving these targets.[395]

[389] Cf. Hammerson (2009), p. 44; Stockland (2008), p. 6.
[390] Cf. Stockland (2008), p. 4; the Carbon Disclosure Project is discussed in detail in Chapter 4.1.4.
[391] Cf. Land Securities Group (2009), p. 21.
[392] Cf. British Land (2009a), p. 6.
[393] Cf. British Land (2009a), pp. 7,16; Hammerson (2009), pp. 12, 44; Land Securities Group (2009), p. 53; Stockland (2009a), pp. 48, 53; Investa Property Group (2009a).
[394] Cf. British Land (2009a), p. 7; Land Securities Group (2009), p. 53; Hammerson (2009), p. 28; Investa Property Group (2009e); Stockland (2009a), p. 48.
[395] Cf. Stockland (2009a), p. 47.

Determination of Sustainability Strategies for the Execution of Investments

The level to which CSR issues are incorporated into companies' investment activities varies greatly. From the outset, CSR initiatives of surveyed companies have largely focused on their property development activities. This focus is reflected in the fact that all companies have policies in place to take account of sustainability in the property development process. All companies define minimum performance and certification standards for new developments. In addition, they devise guidelines and toolkits that set targets and requirements for the design and construction phases, provide best practice information and define standards for the overall development process. The main components of such sustainable development guidelines are requirements pertaining to energy efficiency standards, the use of sustainable materials, waste management, the use of resources in the construction process, the integration of ecological design features, such as green roofs, photovoltaic panels and grey water recycling, and the employment of external sustainability consultants.[396]

On the contrary, the integration of CSR issues into the decision-making framework of property acquisition and property retention is less advanced. Land Securities and Hammerson indicate that they have not formally defined specific guidelines and rules for explicitly considering sustainability issues in the acquisition process. British Land, Investa and Stockland have outlined dedicated frameworks to ensure that their CSR policies are implemented in a consistent manner from the earliest involvement with a potential property acquisition. These documents aim at identifying and considering broader sustainability issues traditionally not covered by the pre-acquisition due diligence process.[397] With regard to property retention, Investa and Stockland target determined sustainability performance levels to achieve across their portfolios.[398] None of the surveyed companies has formally integrated sustainability criteria into the decision-making process of property disposition.

Portfolio Strategies for Asset and Property Management

Because the rate of new construction is low in industrialized countries, real estate investors recognize that the greatest opportunities for improving the sustainability performance of their investment portfolios are in the standing portfolio stock.[399] Likewise, all surveyed companies have started to slowly shift the emphasis of their CSR initiatives to reducing en-

[396] Cf. British Land (2009a), pp. 30, 62; Hammerson (2009), p. 28; Land Securities Group (2009), p. 21; Investa Property Group (2009d); Stockland (2009a), pp. 9, 21, 52.
[397] Cf. British Land (2009b); Stockland (2009a), pp. 21, 60; Investa Property Group (2007b), pp. 2, 5.
[398] Cf. Stockland (2009a), pp. 3, 62; Investa Property Group (2009d).
[399] See Chapter 3.1.

ergy consumption, resource use and CO_2 emissions within their existing property stock. At this juncture, the most important activities pertain to changing occupant behavior, integrating sustainability issues into building management procedures and considering sustainability issues in the supply chain and the procurement of goods and services.

Property companies have direct control over only a small proportion of their properties, with occupants being accountable for the majority of space. Therefore, working together with occupants to improve the sustainability performance of their properties constitutes a mayor part of the surveyed companies' CSR initiatives. At this juncture, the surveyed companies are pursuing a bipartite approach. First, they have started to adapt their relationships with tenants by introducing owner and tenant sustainability covenants into lease contracts ("green leases").[400] It is worth noting that the U.K. property investment companies have joined forces to achieve a common understanding and wider prevalence of green leases by developing a common green lease framework.[401] However, the Australian Investa Property Group has to be regarded as the leader in green leases. Besides implementing green leases, Investa Property Group offers a "Greenhouse Guarantee" to its tenants. In this arrangement, an external energy solution company evaluates possibilities to upgrade rented space by means of implementing energy-saving technologies and provides a firm quote with a guaranteed cap on energy bills and greenhouse gas emissions. If energy consumption exceeds the guaranteed cap after upgrading the office space, the cost of any excess energy will be refunded by Investa Property Group, and green energy will be purchased to deliver the reduction in greenhouse gas emissions. If the energy performance is better than expected, the occupants can keep the savings.[402] Second, in addition to the adaptation of lease arrangements, the surveyed companies started to increase their engagement with tenants by extending their services in terms of sustainability. Most extensive actions comprise conducting regular sustainability meetings with occupants and establishing dedicated working groups involving tenants (British Land, Hammerson).[403] Further services include the provision of tenant sustainability guides and sustainable fit-out guides and the procurement of expert advice and environmental auditing.[404] While engaging with tenants, surveyed companies also take account

[400] Cf. British Land (2009a), p. 42; Hammerson (2009), p. 37; Land Securities Group (2009), p. 22; Investa Property Group (2007a); Stockland (2008), p. 27; some companies introduced a carbon reduction memorandum of understanding (MoU). This is an agreement between the landlord and its occupants that aims to reduce resource use and generate cost savings. It is worth noting that the MoU is not legally binding.
[401] Cf. Better Buildings Partnership (2009).
[402] Cf. Investa Property Group (2010e).
[403] Cf. British Land (2009a), pp. 42, 71; Hammerson (2009), pp. 42, 60.
[404] Cf. British Land (2009a), p. 6; Hammerson (2009), p. 38; Land Securities Group (2009), pp. 22, 43; Stockland (2009a), pp. 17, 35; Stockland (2008), pp. 11, 26; Investa Property Group (2010a).

of sustainability issues in their building management procedures. Adopted practices include devising low-cost best practice strategies to curb resource use and emissions (e.g., low energy "intelligent" lighting and water-saving devices), conducting regular energy efficiency audits to ensure that the plant and machinery are working at their optimum performance levels and providing formalized guidance toolkits for sustainable property management (e.g., the Land Securities Shopping Center Environmental Management Toolkit).[405] In addition, they have begun to develop value-added approaches to upgrade the sustainability performance of individual buildings. These efforts are framed by detailed long-term performance targets that the companies aim to reach.[406] The recorded activities to achieve these targets comprise systematically assessing the portfolio stock to identify existing reduction opportunities and developing examples of best practices in upgrading properties (e.g., energy-efficient cooling and air-conditioning, energy use-reducing facades and on-site low-carbon energy sources). Stockland, in response to the Energy Efficiency Opportunities Act, introduced the most comprehensive framework for identifying opportunities to improve the sustainability performance of its portfolio.[407] Its approach includes systematically identifying and evaluating opportunities to increase energy efficiency across its portfolio and assessing investment opportunities on the basis of its carbon abatement cost curve.[408]

The importance of considering sustainability issues in the supply chain and in the procurement of goods and services reflects in the fact that all surveyed companies have realized sustainable procurement policies. They help to ensure that suppliers and service providers acting on behalf of the company operate in line with the employer's CSR objectives. All companies have devised specific tools to assess the CSR performance of prospective suppliers and service providers. The implemented procurement policies cover both the development activities and the management of existing property stock.[409]

Definition of a Reporting Framework

CSR reporting constitutes a major element of the CSR initiatives of all surveyed companies. It comprises extensive CSR reports of 73 to 120 pages in length, guidelines demonstrating the integration of sustainability practices into business operations and dedicated CSR sec-

[405] Cf. British Land (2009a), pp. 17, 22; Hammerson (2009), pp. 10, 12, 29; Land Securities Group (2009), pp. 22, 28; Stockland (2009a), pp. 20, 21, 46, 60; Investa Property Group (2007b), pp. 2,3.
[406] Cf. British Land (2009a), p. 57; Hammerson (2009), p. 41; Stockland (2009b); Investa Property Group (2007b).
[407] The Energy Efficiency Opportunities ACT is discussed in detail in Chapter 3.2.1.
[408] Cf. Stockland (2009b).
[409] Cf. British Land (2010b), p. 40; Hammerson (2009), p. 35; Land Securities Group (2009), p. 23; Stockland (2009a), pp. 16, 33, 37; Investa Property Group (2007b).

tions within the companies' websites. CSR reports represent the most crucial piece of reporting. They contain and communicate information on the companies' CSR models, the organizational implementation of CSR, initiatives to improve energy efficiency, annual and long-term targets, the review of previous activities, case studies and environmental performance metrics. In particular, companies pay special attention to the procurement of quantitative data that indicate the efficiency of their CSR initiatives.[410] The surveyed companies further highlight their CSR efforts by actively supporting and participating in CSR indexes such as the Dow Jones Sustainability Index and the FTSE4Good Index.

In general, documenting and communicating a company's efforts in the CSR realm is becoming increasingly prevalent in the business community. CSR reports that showcase companies' social and environmental good deeds are the centerpieces of reporting. Such publications are sometimes criticized for rarely offering a coherent framework for CSR activities and instead providing aggregated anecdotes of uncoordinated initiatives to demonstrate a company's social and environmental awareness.[411] Despite such shortcomings, the analysis of companies' CSR reports regularly constitutes one of few sources that provide a picture of industry-specific CSR issues and information on how to address these issues in day-to-day business operations. The present analysis of CSR reports shows that the leading international property companies have implemented extensive CSR initiatives that comprise a broad range of CSR practices across their business activities. However, firms report on their CSR initiatives in ways that are difficult to understand and compare. For example, there is neither a common structure nor standardization in the ways in which they provide information. Moreover, the investigated property companies rely heavily on case studies to outline their CSR activities. Consequently, it is quite difficult to identify the strategic frameworks that underpin their CSR initiatives. Nevertheless, the analysis of their CSR reports allows identifying a broad range of CSR mechanisms to address CSR issues in the real estate sector.

4.1.4 Sustainability Standards in Non-Governmental Organizations' CSR Accreditation Schemes

The increased awareness that sustainability is a top priority for both governments and society has led major non-governmental organizations (NGOs) to launch initiatives dedicated to encouraging the adoption of sustainable corporate management procedures. Among them, the UN Environment Program Finance Initiative (UNEP FI), the Carbon Disclosure Project

[410] Cf. British Land (2009a); Hammerson (2009); Investa Property Group (2009c); Land Securities Group (2009); Stockland (2009a).
[411] Cf. Porter, M./Kramer, M. (2006), p. 2; Szekely, F./Knirsch, M. (2005), p. 628.

(CDP) and the International Organization for Standardization (ISO) have established the most influential standards and codes. Companies can decide to embrace such international standards for a number of reasons. For example, they may strive to meet legal compliance requirements, to build trust and credibility, to gain or restore stakeholder confidence or to improve management systems.[412] In the following paragraph, the accreditation processes of the aforementioned initiatives are assessed in detail to capture their requirements for a sustainability-oriented company. Further notable organizations working toward mainstream sustainability in the financial sector are the Institutional Investors Group on Climate Change (IIGCC), the IPF Sustainability Special Interest Group, the Investor Network on Climate Risk (INCR) and Ceres.

United Nations Environment Program Finance Initiative – Principles for Responsible Investment

In 2006, the United Nations Environment Program Finance Initiative (UNEP FI) launched the Principles for Responsible Investment (PRI). The UNEP FI is a global partnership between the UN Environment Program and the financial sector. The PRI aim to align investors' activities with the broader objectives of society. Signatories to the PRI commit to consider sustainability issues in their investment and ownership policies and practices. In addition, they are required to report on how they implement the principles and to provide an explanation where they do not comply with them. To translate the principles into business operations and to support the incorporation of sustainability issues into investment decision-making and ownership practices, the UNEP FI has devised a list of potential sustainable management procedures.[413] The UNEP FI's work on property investing is carried out by the Property Working Group. Its overall objective is to encourage the uptake of property investment and management practices that achieve the best possible environmental, social and financial results. For this purpose, the Property Working Group has adapted the potential actions that were primary outlined for multi-asset investment portfolios to the specific needs of property companies. The PRI and possible activities in real estate investment and management are summarized in Table 12.[414]

Table 12: UNEP FI Principles for Responsible Investment

Principles for Responsible Investment	Possible Actions in Property Industry
1. We will incorporate ESG issues into investment analysis	***General actions***: ➢ Address ESG issues in investment policy statements

[412] Cf. Szekely, F./Knirsch, M. (2005), p. 635.
[413] Cf. UNEP Finance Initiative (2006), p. 4.
[414] Cf. UNEP Finance Initiative (2008a), p. 5.

and decision-making processes	➢ Support development of ESG-related tools, metrics, and analyses ➢ Assess the capabilities of internal investment managers to incorporate ESG issues ➢ Assess the capabilities of external investment managers to incorporate ESG issues ➢ Ask investment service providers (such as financial analysts, consultants, brokers, research firms, or rating companies) to integrate ESG factors into evolving research and analysis ➢ Encourage academic and other research on this theme ➢ Advocate ESG training for investment professionals ***Property specific actions*** ➢ Adopt governance practices that support ESG concerns ➢ Make a broad commitment to addressing ESG issues ➢ Make policy commitments focused on selected areas ➢ Establish leadership positions and teams dedicated to ESG issues ➢ Assess the capabilities of internal investment managers on ESG issues ➢ Consider ESG issues in decision-making • when allocating assets or managing portfolio composition • when creating new investment vehicles • when selecting funds or fund managers • when selecting properties for acquisition • when selecting property managers • when managing existing property assets • when developing new properties • when obtaining other goods and services from suppliers ➢ Develop investment analysis tools and metrics ➢ Support research on related themes ➢ Work with service providers to incorporate ESG considerations
2. We will be active owners and incorporate ESG issues into our ownership policies and practices	***General actions***: ➢ Develop an active ownership policy consistent with the Principles ➢ Exercise voting rights or monitor compliance with voting policy (if outsourced) ➢ Develop an engagement capability (either directly or through outsourcing) ➢ Participate in the development of policy, regulation, and standard setting (such as promoting and protecting shareholder rights) ➢ File shareholder resolutions consistent with long-term ESG considerations ➢ Engage with companies on ESG issues ➢ Participate in collaborative engagement initiatives ➢ Ask investment managers to undertake and report on ESG-related engagement ***Property specific actions*** ➢ Exercise shareholder voting rights or file shareholder resolutions ➢ Engage with suppliers, joint venture partners and tenants on ESG issues
3. We will seek appropriate disclosure on ESG issues by the entities in which we invest	***General actions***: ➢ Ask for standardized reporting on ESG issues (using tools such as the Global Reporting Initiative) ➢ Ask for ESG issues to be integrated within annual financial reports ➢ Ask for information from companies regarding adoption of/adherence to relevant norms, standards, codes of conduct or international initiatives (such as the UN Global Compact) ➢ Support shareholder initiatives and resolutions promoting ESG disclosure ***Property specific actions*** ➢ No further property specific subsections
4. We will promote acceptance and implementation of the Principles within the investment industry	***General actions***: ➢ Include Principles-related requirements in requests for proposals (RFPs) ➢ Align investment mandates, monitoring procedures, performance indicators and incentive structures accordingly (for example, ensure investment management processes reflect long-term time horizons when appropriate) ➢ Communicate ESG expectations to investment service providers ➢ Revisit relationships with service providers that fail to meet ESG expectations ➢ Support the development of tools for benchmarking ESG integration ➢ Support regulatory or policy developments that enable implementation of the Principles ***Property specific actions*** ➢ No further property specific subsections

5. We will work together to enhance our effectiveness in implementing the Principles	***General actions***: ➢ Support/participate in networks and information platforms to share tools, pool resources, and make use of investor reporting as a source of learning ➢ Collectively address relevant emerging issues ➢ Develop or support appropriate collaborative initiatives ***Property specific actions*** ➢ No further property specific subsections
6. We will each report on our activities and progress towards implementing the Principles	***General actions***: ➢ Disclose how ESG issues are integrated within investment practices ➢ Disclose active ownership activities (voting, engagement, and/or policy dialogue) ➢ Disclose what is required from service providers in relation to the Principles ➢ Communicate with beneficiaries about ESG issues and the Principles ➢ Report on progress and/or achievements relating to the Principles using a 'Comply or Explain' approach ➢ Seek to determine the impact of the Principles ➢ Make use of reporting to raise awareness among a broader group of stakeholders ***Property specific actions*** ➢ No further property specific subsections

Source: UNEP Finance Initiative (2006), p. 4.

The PRI outline a broad range of management activities in which investment firms should take sustainability issues into account (see Table 12). In the first instance, their design is adapted to their application in the management of large multi-asset portfolios. This also reflects in the proposed real estate-specific sustainability activities, with the emphasis clearly being on investment decision making (e.g., considering sustainability when allocating assets, creating new investment vehicles, selecting funds, selecting properties for acquisition). Beyond that, the PRI strive to propel the sustainability agenda by requiring the signatories to strengthen their collaborations with peers, service providers and tenants, to raise awareness of sustainability in the investment community and among employees and to advocate for CSR and SRI reporting. Activities relating to the management of the existing portfolio stock that arise from the more direct ownership control of properties (e.g., establishing measurement and monitoring processes and setting benchmarks) are not addressed in detail.

Carbon Disclosure Project

The Carbon Disclosure Project (CDP) is an independent not-for-profit organization that holds the largest database of primary corporate climate change information in the world. It focuses exclusively on climate change issues relating to carbon emissions. Climate change data are collected on behalf of 534 institutional investors with a combined $64 trillion in assets under management.[415] Currently, 2,500 organizations in 60 countries around the world measure and disclose their greenhouse gas emissions and climate change strategies through the CDP. Companies can take part in the CDP assessment by responding to the an-

[415] Cf. Carbon Disclosure Project (2010d).

nual CDP questionnaire. The information companies provide on climate change is not verified by the CDP. Although participation in the CDP survey is voluntary, response rates are high with, for example, 81% of the global 500 index companies answering the CDP questionnaire.[416] Among the various CDP schemes, the Investor CDP scheme represents the most important program. It provides critical climate change data from thousands of the world's largest corporations to inform the global marketplace on investment risk and commercial opportunity. At this juncture, the four principal areas of analysis are management's view of the risks and opportunities that climate change presents to the business, greenhouse gas emissions accounting, management's strategy to reduce emissions, minimize risk and capitalize on opportunity and corporate governance with regard to climate change.[417] An overview of the CDP Investor scheme is displayed in the following table.[418] Appendix 13 shows the requirements of the CDP assessment framework in greater detail.

Table 13: Assessment criteria of the Carbon Disclosure Investor scheme

1. Governance
➢ Group and Individual Responsibility ➢ Individual Performance
2. Risks and Opportunities
➢ Process to identify risks and opportunities ➢ Risks ➢ Opportunities
3. Strategy
➢ Strategy ➢ Targets ➢ Emission Reduction Activities ➢ Engagement with Policy Makers
4. GHG Emissions Accounting, Energy and Fuel Use, and Trading
➢ Reporting Boundary ➢ Methodology ➢ Scope 1 Direct GHG Emissions ➢ Fuel Consumption ➢ Scope 2 Indirect GHG Emissions ➢ Purchased Energy ➢ Contractual Arrangements Supporting Particular Types of Electricity Generation ➢ Scope 3 Other Indirect GHG Emissions ➢ Emissions Avoided Through Use of Goods and Services ➢ Carbon Dioxide Emissions from Biologically Sequestered Carbon ➢ Emissions Intensity ➢ Emissions History ➢ External Verification/ Assurance ➢ Emissions Trading and Offsetting
5. Climate Change Communications
➢ Climate Change Communications

Source: Carbon Disclosure Project (2010b), p. 2.

[416] Cf. Carbon Disclosure Project (2009a), p. 16.
[417] Cf. Carbon Disclosure Project (2010a), p. 3.
[418] Cf. Carbon Disclosure Project (2010b), p. 2.

The CDP provides a comprehensive framework for assessing companies' management approaches in terms of their carbon emissions. The very high level of detail of the CDP assessment requires companies to implement a thorough process to mitigate their risks from carbon emissions. Major elements of such a process are the appointment of employees or teams dedicated to governing the company's activities, detailed assessment of associated risks and opportunities, the definition of a strategy and relevant targets, the introduction of CO_2 measurement procedures and the reporting of the company's emissions. By outlining such a detailed scheme to judge corporate carbon emissions management, the CDP provides a holistic, strategic process that companies can follow for effectively addressing risks from carbon emissions.

Apart from compiling research reports, the CDP publishes corporate performance rankings in the form of the CDP Leadership Index. The CDP rating methodology comprises both the appraisal of the performance of the company and the assessment of the quality of disclosure. The performance rating component aims to give an indication of the level of action taken by the company to manage its impacts on and from climate change.[419] To be eligible for inclusion in one of the CDP Leadership Indexes, companies must score in the highest 10% of all constituents of the underlying index, and their response to the CDP has to be publicly available.[420] In 2009, Hammerson (U.K.), Simon Property Group (U.S.A.) and Shaftesbury (U.K.) were the best-performing companies in the real estate sector.[421]

International Organization for Standardization - ISO 14001

The International Organization for Standardization (ISO) has established a number of widely recognized international standards that aim to promote more effective and efficient environmental management practices in organizations (ISO 14000 series).[422] Of these, ISO 14001:2004 and ISO 14004:2004 represent the most important codes for companies. They define a set of requirements that an environmental management system (EMS) must meet to qualify for certification.[423] Companies adopting an ISO 14001-based EMS are supposed to realize an overall enhanced efficiency of the organization, cost reductions in waste management, savings in the consumption of energy and materials and the implementation of a framework for the continual improvement of a company's environmental performance.[424]

[419] Cf. Carbon Disclosure Project (2010c).
[420] Cf. Carbon Disclosure Project (2009a), p. 18.
[421] Cf. Carbon Disclosure Project (2010c).
[422] Cf. Große, H. (2003), p. 135; Pfriem, R. (2001), p. 5; Dyllick, T. (1999), p. 118.
[423] Cf. International Organization for Standardization (2010).
[424] Cf. Lamprecht, J. (1997), pp. 43 et seqq.

However, the introduction of an ISO 14001-certified EMS requires significant human and time resources, especially during the initial implementation phase. Moreover, considerable documentation and administration efforts are associated with the running of an ISO 14001 system.[425] So far, 5,800 organizations in Germany have implemented an ISO 14001-certified EMS.[426]

The core set of management practices that must be adopted when implementing an effective EMS are outlined in Section 4 of the ISO 14001 code. The following table gives an overview of the requirements that companies must fulfill to qualify for certification. Appendix 14 provides a detailed list of all elements of an ISO 14001-based EMS.

Table 14: Framework of an ISO 14001-based EMS

1. Scope
➢ Scope of Certification
2. Environmental Policy
➢ Environmental Policy
3. Planning
➢ Environmental Aspects ➢ Legal and other Requirements ➢ Objectives, Targets and Programs
4. Implementation and Operation
➢ Resources, Roles, Responsibility & Authority ➢ Competence, Training and Awareness ➢ Communication ➢ Documentation ➢ Control of Documents ➢ Operational Control ➢ Emergency Preparedness and Response
5. Checking and Corrective Action
➢ Monitoring and Measurement ➢ Evaluation of Compliance ➢ Nonconformity, Corrective Action and Preventive Action ➢ Control of Records ➢ Internal Audit
6. Management Review
➢ Management Review

Source: Piper, L. et al. (2003), pp. 40–42.

The ISO 14001 standard specifies a comprehensive strategic framework for developing environmental policies that take account of the most significant environmental aspects of a company's business operations and consider the legal requirements and other requirements

[425] Cf. Glatzner, L. (2001), p. 45.
[426] Cf. Peglau, R. (2010).

to which the organization subscribes. In addition, it provides a structure for gathering, interpreting and communicating environmentally relevant information in a holistic and systematic environmental management approach.[427] However, the ISO 14001 code only defines general strategic requirements that are applicable in any EMS irrespective of an organization's activities, products and services. Therefore, it does neither identify environmental aspects that are relevant in specific industry sectors nor define environmental performance criteria.[428] This omission has resulted in the ISO 14001 code being criticized for a lack of clarity in the requirements of the standard and for a lack of methods for analysis and evaluation.[429]

The Eco-Management and Audit Scheme (EMAS) operated by the European Union is another external environmental accreditation scheme for companies. It is often discussed in conjunction with the ISO 14001 standard because its core requirement is an ISO 14001-certified EMS. Apart from that, the EMAS accreditation requires companies to take further measures relating to, for example, external reporting of environmental strategies.[430] In contrast to ISO 14001, which is an internationally accepted and prevalent certification framework, the EMAS is used mainly in Germany. In the present dissertation, the EMAS accreditation methodology is not analyzed in greater detail. First, it is fairly similar to the ISO 14001 standard and, second, the EMAS certification growth rates have been constantly declining in recent years.[431]

Global Reporting Initiative

The Global Reporting Initiative (GRI) is a network-based, non-profit organization that oversees one of the world's most prevalent standards for CSR and sustainability reporting. Through developing and continuously refining the GRI Sustainability Reporting Framework, the GRI aims to mainstream and elevate disclosure on economic, environmental and social performance reporting to a level equivalent to that of financial reporting in rigor, comparability, auditability and general acceptance.[432] The first set of guidelines was issued in 2000, with updates released in 2002 (known as the G2 Guidelines) and in 2006 (known as the G3 Guidelines). To accomplish credibility and relevance, the GRI Sustainability Reporting Framework is developed using a global multi-stakeholder, consensus-seeking process with participants drawn from a cross-section of society—business, civil society, accounting, investors, governments, academics and others—from all around the world. This diversity

[427] Cf. Piper, L. et al. (2003), pp. 30 et seqq.
[428] Cf. Lamprecht, J. (1997), pp. 43 et seqq.
[429] Cf. Glatzner, L. (2001), p. 45.
[430] Cf. Große, H. (2003), p. 135.
[431] Cf. Glatzner, L. (2007); Clausen, J. (2001), p. 33.
[432] Cf. Global Reporting Initiative (2010b); Global Reporting Initiative (2010e); Willis, A. (2003), pp. 233 et seqq.

ensures that multiple needs from all stakeholders are taken into account.[433] The GRI Sustainability Reporting Framework is widely used by corporations to document and communicate their environmental and social performance. As of November 2010, more than 1,300 organizations from 60 countries have applied the GRI Guidelines to produce their sustainability reports.[434] Its widespread acceptance also reflects in the fact that more than three quarters (77 percent) of the world's largest 250 companies follow the GRI Sustainability Framework to report on their sustainability initiatives.[435] To meet the needs of different organizations in terms of the extent of their reporting, the GRI offers three different application levels (A, B and C). The reporting criteria at each level reflect an increasing application or coverage of the GRI Sustainability Reporting Framework.[436]

The GRI Sustainability Reporting Framework consists of the Sustainability Reporting Guidelines (G3 Guidelines) as well as the GRI Reporting Protocols and the GRI Sector Supplements.[437] The G3 Guidelines provide universal guidance for reporting on companies' sustainability performances and are applicable to organizations of any size or type and from any sector or geographic region. They form the basis for all sustainability reporting because they outline core reporting contents such as the GRI Reporting Principles and the GRI Standard Disclosures. The GRI Reporting Protocols define key terms, compilation methodologies and the intended scope of each sustainability indicator in the GRI Guidelines. The GRI Sector Supplements respond to the limits of a one-size-fits-all approach. They complement—not replace—the core G3 Guidelines by addressing and introducing a unique set of sustainability issues faced by different industry sectors.[438] In 2010, the GRI published a first draft of the GRI Sustainability Reporting Construction and Real Estate Sector Supplement.[439] Whereas the GRI Principles and the GRI Protocols describe how to report, the GRI Standard Disclosures and the GRI Sector Supplements determine what to report.[440] The standard disclosures section contains three key areas—strategy and profile, management approach and performance indicators—on which reporting companies are required to provide information. Disclosures on strategy and profile provide information on a company's strategy, profile and governance and thus set an overall context that should enable interested

[433] Cf. Global Reporting Initiative (2010d); Willis, A. (2003), pp. 233–234.
[434] Cf. Global Reporting Initiative (2010a).
[435] Cf. KPMG (2009), p. 35.
[436] Cf. Global Reporting Initiative (2006), p. 5.
[437] Cf. Global Reporting Initiative (2010d).
[438] Cf. Global Reporting Initiative (2006), pp. 3 et seqq.
[439] Cf. Global Reporting Initiative (2010c); the GRI Construction and Real Estate Supplement does not introduce new criteria in the GRI Reporting Framework. It provides guidance on how to use the GRI Reporting Framework in the real estate sector.
[440] Cf. Global Reporting Initiative (2006), p. 3.

stakeholders to understand an organization's performance. Disclosures on the management approach must cover how a firm addresses a given set of topics to provide the context for understanding the company's performance in a specific area. The performance indicators reporting section serves the purpose of eliciting comparable information on the economic, environmental and social performance of the organization.[441] The following table summarizes the GRI Sustainability Reporting Framework. An extensive list of all reporting criteria of the GRI Sustainability Reporting Framework is given in Appendix 15.

Table 15: GRI Sustainability Reporting Guidelines (G3 Guidelines)

1. Profile	**2. Economic**
1. Strategy and analysis 2. Organizational profile 3. Report parameters a) Report profile b) Report scope and boundary c) GRI content index d) Assurance 4. Governance, commitments, and engagement a) Governance b) Commitments to external initiatives e) Stakeholder engagement	***Disclosure on management approach*** ➢ Goals and performance ➢ Policy ➢ Additional contextual information ***Economic performance indicators*** ➢ Aspect: Economic Performance ➢ Aspect: Market Presence ➢ Indirect Economic Impacts
3. Environmental	**4. Social**
Disclosure on management approach ➢ Goals and performance ➢ Policy ➢ Organizational responsibility ➢ Training and awareness ➢ Monitoring and follow-up ➢ Additional contextual information ***Economic performance indicators*** ➢ Aspect: Materials ➢ Aspect: Energy ➢ Aspect: Water ➢ Aspect: Biodiversity ➢ Aspect: Emissions, effluents, and waste ➢ Aspect: Products and services ➢ Aspect: Compliance ➢ Aspect: Transport ➢ Aspect: Overall	***Labor practices and decent work*** ***Disclosure on management approach*** ➢ Goals and performance ➢ Policy ➢ Organizational responsibility ➢ Training and awareness ➢ Monitoring and follow-up ➢ Additional contextual information ***Economic performance indicators*** ➢ Aspect: Employment ➢ Aspect: Labor/Management relations ➢ Aspect: Occupational health and safety ➢ Aspect: Training and education ➢ Aspect: Diversity and equal opportunity ***Human Rights*** ***Disclosure on management approach*** ➢ Goals and performance ➢ Policy ➢ Organizational responsibility ➢ Training and awareness ➢ Monitoring and follow-up ➢ Additional contextual information ***Economic performance indicators*** ➢ Aspect: Investment and procurement practices ➢ Aspect: Non-discrimination ➢ Aspect: Freedom of association and collective bargaining ➢ Aspect: Child labor ➢ Aspect: Forced and compulsory labor ➢ Aspect: Security practices ➢ Aspect: Indigenous rights ***Society*** ***Disclosure on management approach***

[441] Cf. Global Reporting Initiative (2006), pp. 5, 20 et seqq.

	➢ Goals and performance ➢ Policy ➢ Organizational responsibility ➢ Training and awareness ➢ Monitoring and follow-up ➢ Additional contextual information ***Economic performance indicators*** ➢ Aspect: Community ➢ Aspect: Corruption ➢ Aspect: Public policy ➢ Aspect: Anti-competitive behavior ➢ Aspect: Compliance ***Product Responsibility*** ***Disclosure on management approach*** ➢ Goals and performance ➢ Policy ➢ Organizational responsibility ➢ Training and awareness ➢ Monitoring and follow-up ➢ Additional contextual information ***Economic performance indicators*** ➢ Aspect: Customer health and safety ➢ Aspect: Product and service labeling ➢ Aspect: Marketing communications ➢ Aspect: Customer privacy ➢ Aspect: Compliance

Source: Global Reporting Initiative (2006), pp. 20 et seqq.

Table 15 shows that the GRI Sustainability Reporting Framework determines a comprehensive set of indicators that organizations have to report to meet the GRI reporting requirements. It comprises both strategic CSR management aspects (e.g., the existence of policies, the definition of goals and the clarification of the organizational responsibility) as well as performance-oriented CSR issues (e.g., reporting on energy consumption, water use and waste recycling). The GRI has integrated a broad range of sustainability issues into its reporting framework. The comprehensiveness of this framework ensures that companies that intend to report according to the GRI standard address all relevant sustainability issues, and allows companies to derive a set of widely recognized sustainability issues that have to be taken into account if they seek to develop a CSR initiative. The primary purpose of the GRI Guidelines is the provision of a widely applicable sustainability reporting framework. Therefore, it does not outline strategies and mechanisms for managing the relevant sustainability issues in a company's day-to-day operations.

This chapter examines the accreditation processes of the most important initiatives launched by non-governmental organizations to propel the uptake of sustainable management procedures in companies. Their accreditation processes differ considerably because they have been designed to fit different purposes and objectives. The PRI seeks to mainstream the integration and consideration of sustainability issues in investment decision making, whereas the CDP is dedicated to the management of carbon emissions. The ISO 14001 aims to pro-

vide a comprehensive set of requirements for the development of an EMS, and the GRI outlines a framework to improve CSR reporting standards. The present analysis of their accreditation processes allows both the determination of relevant sustainability issues and the derivation of strategic steps that have to be considered in a sustainable property portfolio management framework. The CDP Investor scheme outlines the most detailed process because it deals exclusively with carbon emissions. It describes a comprehensive process that companies must adhere to in managing their carbon emissions. In comparison, the PRI are less detailed, and they primarily identify investment management activities in which companies must consider sustainability. However, they do not identify which sustainability themes companies should consider. Similarly, the ISO 14001 is limited to the identification of strategic issues. It deals only with the process of managing environmental issues but does not identify the relevant sustainability issues. The GRI Sustainability Reporting Framework is the most comprehensive tool and comprises both the determination of sustainability issues and the elements of the strategic process that are necessary to address them. However, none of the initiatives was specifically developed for the real estate sector. For this reason, they do not identify practices and mechanisms for introducing sustainability issues into day-to-day management operations of property companies.

4.2 Structure of a Sustainable Property Portfolio Management Process

The purpose of the following section is to devise the structure of a sustainable property portfolio management process (framework). Such a process must consist of two different levels. First, it has to comprise a strategic level that outlines the procedural steps of a sustainability approach in property investment and management. Second, it must identify detailed practices and mechanisms to manage sustainability in a company's day-to-day business operations.

In the following, the property portfolio management process shown in Chapter 2 (see Table 3) is used as the overall frame of reference. This approach ensures that the proposed CSR process is developed in connection with property companies' business activities and takes established management procedures into account. Accordingly, the proposed CSR framework aims to provide strategies and mechanisms to supplement the traditional portfolio management procedures. The toolkit is not meant to be prescriptive; rather, it should provide a guide for interested property investors on how to address sustainability in property portfolio management activities. The information for developing the structure of the sustainable property portfolio management process is drawn from the sources examined in Chapter 4.1.

The strategic steps and mechanisms that are regarded as important and appropriate for addressing sustainability in property portfolio management are merged to form one comprehensive framework. In this way, the proposed framework takes account of strategies, mechanisms and requirements of a broad range of market players and CSR initiatives.

The development of a formalized sustainability policy represents both a good starting point and a prerequisite for the integration of sustainability issues into a company's business strategy and operations.[442] Its main purposes are to outline the scope and content of a company's sustainability endeavors and to demonstrate a company's commitment to the sustainability agenda. In this regard, the identification of sustainability themes that have to be addressed in a company's sustainability policy is of the utmost importance as they influence the overall direction and final outcome of a company's sustainability initiative. Ensuring that the sustainability policy covers all relevant issues requires companies to thoroughly analyze the most important sustainability drivers in the real estate sector. At this juncture, the most sophisticated approach is to conduct an explicit materiality analysis to identify the sustainability issues that most strongly impact a company's operations. This approach allows companies to detect risks and business opportunities emerging from the sustainability agenda.[443] On this basis, companies are able to develop a set of targets that outline both the future direction of their sustainability initiatives and the performance levels that they seek to achieve.[444] The most popular way to demonstrate a company's commitment to CSR is to formally document its CSR policy and to draft and disclose a mission statement.[445]

The transition from commitment to management of sustainability issues necessitates the development of internal governance structures. Companies need to create specific departments or employ or task specific employees to ensure the proper integration of sustainability mechanisms into day-to-day management procedures. In terms of human resources, there are questions related to the assignment and organization of tasks, responsibilities and employees

[442] The existence of a sustainability policy constitutes an essential part of a CSR approach in Rapson et al. (2008) (Chapter 4.1.1), SAM Group, FTSE4Good, RiskMetrics (Chapter 4.1.2), the analyzed CSR agendas (Chapter 4.1.3) and UNEP FI, CDP, ISO 14000, GRI (Chapter 4.1.4).

[443] Hammerson and Stockland highlight the importance of a formal sustainability materiality review. Likewise, an analysis of sustainability risks and business opportunities is an essential part of a CSR approach in SAM Group, FTSE4Good, RiskMetrics (Chapter 4.1.2) and CDP, ISO 14000, GRI (Chapter 4.1.4).

[444] Commitment to the use of targets is required in FTSE4Good (Chapter 4.1.2) and CDP, ISO 14000, GRI (Chapter 4.1.4). Each surveyed company explicitly defined CSR targets (Chapter 4.1.3).

[445] The formal documentation and disclosure of a CSR policy constitutes an essential part of a CSR approach in FTSE4Good (Chapter 4.1.2), the analyzed CSR agendas (Chapter 4.1.3) and ISO 14000, GRI; a statement articulating a company's sustainability perspective is provided by each surveyed company (Chapter 4.1.3).

as well as to linking remuneration to the attainment of sustainability goals.[446] Aside from the realization of internal governance structures, companies have to develop procedures for the distribution of best practice information on sustainability activities among employees as well as for the education and training of employees, in particular asset and property managers.[447] In addition to specifying internal responsibilities, engagement in sustainability and in real estate industry bodies as well as the support of dedicated research are all thought to further promote a company's sustainability initiative.[448]

Apart from the specification of internal responsibilities for a company's sustainability agenda, a comprehensive sustainability approach at the corporate level requires the establishment of a rigorous risk management process in terms of sustainability.[449] Such a process must capture sustainability risks that might adversely affect a company's business results as well as provide a framework for continually refining the company's sustainability management approach so that it keeps track of newly emerging issues.[450] In addition, it must monitor the progress of the implementation of a company's sustainability policy.[451] The former involves the determination of indicators that enable the assessment and monitoring of risk related to specific sustainability issues and the development of methodologies to capture the financial impacts of sustainability risks. The latter necessitates the introduction of internal structures for regularly reviewing a company's sustainability policy and portfolio performance data, compiling internal progress reports and reporting to the board as well as controlling the introduction and application of specific sustainability guidelines and processes. With regard to risk management, the implementation and use of a certified EMS represents an effective approach to establish a management framework that ensures that a company comprehensive-

[446] Clearly specifying responsibilities and employing or tasking dedicated employees are considered important in FTSE4Good, RiskMetrics (Chapter 4.1.2), the analyzed CSR agendas (Chapter 4.1.3) and UNEP FI, CDP, ISO 14000, GRI (Chapter 4.1.4).

[447] Education and training of employees in the integration of sustainability into business operations is considered to be an essential part of a CSR approach in RiskMetrics (Chapter 4.1.2), the analyzed CSR agendas (Chapter 4.1.3) and ISO 14000, GRI (Chapter 4.1.4).

[448] This assumption is supported by SAM Group (Chapter 4.1.2), the analyzed CSR agendas (Chapter 4.1.3) and UNEP FI, GRI (Chapter 4.1.4).

[449] Risk management represents an important part of managing CSR in RiskMetrics (Chapter 4.1.2), the analyzed CSR agendas (Chapter 4.1.3) and CDP, ISO 14000, GRI (Chapter 4.1.4).

[450] The analysis of sustainability risks is an essential part of a CSR approach in SAM Group, FTSE4Good, RiskMetrics (Chapter 4.1.2), the analyzed CSR agendas (Chapter 4.1.3) and CDP, ISO 14000, GRI (Chapter 4.1.4).

[451] Internal reporting of the progress of a company's CSR agenda represents an important part of managing CSR in FTSE4Good, RiskMetrics (Chapter 4.1.2), the analyzed CSR agendas (Chapter 4.1.3) and ISO 14000, GRI (Chapter 4.1.4).

ly captures its environmental risks and responds properly.[452] Beyond that, participation in externally managed benchmarking services, such as the DJSI and the FTSE4Good index, can be used by companies to objectively assess their sustainability approach and to ensure the continual improvement of their sustainability initiatives.[453]

The measurement and monitoring of the environmental and social performance of the property stock represents another crucial element of a comprehensive and rigorous corporate sustainability approach. In a first step, this element involves the identification of criteria and indicators that have to be measured to assess the sustainability performance of individual properties and property portfolios, the effects of individual energy efficiency improvements and the effectiveness of the sustainability policy. Important indicators in terms of the sustainability performance of real estate are CO_2 emissions, energy use, water consumption and waste recycled.[454] In addition to these indicators, resource use is regarded as important when assessing the sustainability performance of property development activities.[455] To realize meaningful measurement and monitoring, property companies must implement tools that allow the accurate collection and storage of relevant data and provide the resources for analyzing and benchmarking measured data.[456] They eventually have to establish a link between variations in environmental and social performance data and associated financial impacts. Aside from the measurement of operational environmental performance data, a comprehensive assessment of the sustainability performance of a company's property stock requires the evaluation of the sustainability of qualitative building design features (e.g., indoor quality). For this purpose, property companies can draw on building sustainability rating schemes as they provide and measure well-accepted sets of qualitative property sustainability criteria.[457]

[452] The implementation and use of an EMS represents an important part of managing CSR in Rapson et al. (2008), Roberts et al. (2008) (Chapter 4.1.1), Sam Group, FTSE4Good, RiskMetrics (Chapter 4.1.2), the analyzed CSR agendas (Chapter 4.1.3) and ISO 14000 (Chapter 4.1.4).

[453] Cf. British Land (2009a), p. 7; Hammerson (2009), p. 3; Land Securities Group (2009), p. 7.

[454] Measurement and monitoring constitute an essential part of managing CSR in Rapson et al. (2008), Roberts et al. (2008) (Chapter 4.1.1), SAM Group, FTSE4Good, RiskMetrics (Chapter 4.1.2), the analyzed CSR agendas (Chapter 4.1.3) and CDP, ISO 14000, GRI (Chapter 4.1.4).

[455] Resource use in property development is considered by Roberts et al. (Chapter 4.1.1), SAM Group, RiskMetrics (Chapter 4.1.2), the analyzed CSR agendas (Chapter 4.1.3) and GRI (Chapter 4.1.4).

[456] The implementation of measures to strengthen and support data collection is considered by Rapson et al. (2008), Roberts et al. (2008) (Chapter 4.1.1), SAM Group, FTSE4Good, RiskMetrics (Chapter 4.1.2) and the analyzed CSR agendas (Chapter 4.1.3).

[457] The use of sustainability rating schemes to assess the sustainability performance of buildings beyond pure quantitative aspects is indicated in Rapson et al. (2008), Pivo (2008) (Chapter 4.1.1) and the analyzed CSR agendas (Chapter 4.1.3).

Assessing the sustainability performance of their portfolio stock enables property investors to analyze the extent to which the increased importance of sustainability may affect the future risk-return profiles of their property investments. To ensure that their portfolio's future composition is in line with their long-term portfolio strategies and objectives, property investors have to consider sustainability in their decision making on property acquisition and disposition. For this purpose, they are bound to determine sustainability performance levels that their property stock should meet.[458] On this basis, property companies can devise formal guidelines for the consideration of sustainability issues in the acquisition process so that their sustainability concerns are taken into account from the earliest involvement with a potential property acquisition. Sustainability criteria in the acquisition process enable the assessment of whether prospective investment properties comply with or can be brought up to predefined sustainability performance standards.[459] With regard to portfolio composition, the most difficult challenge is to define procedures for the portfolio stock that does not meet predefined sustainability performance levels and that cannot be improved significantly. Accordingly, property companies have to determine to what extent sustainability criteria are incorporated into their decision making on property disposition.[460]

Comprehensively embracing sustainability in the execution of investments additionally requires property companies to take account of sustainability issues in their property development activities. In a first step, this involves the determination of sustainability performance levels and standards that they seek to achieve in their property development projects. The incorporation of sustainability issues into a company's property development activities is more complex than their consideration in the property acquisition process. It requires not only the identification of criteria to define and ensure certain environmental performance levels in buildings but also a plan of the manner in which the targeted performance levels can be reached. For example, the realization of certain energy efficiency levels in buildings implies specific requirements in terms of a building's façade, isolation and HVAC appliances as well as consideration of ecological design features (e.g., low-carbon energy sources). Further sustainability issues that have to be factored into a sustainable property development framework include the use of sustainable materials, efficient resource use in the construction

[458] FTSE4Good (Chapter 4.1.2) and CDP, ISO 14000, GRI (Chapter 4.1.4) require committing to the use of targets in general. However, these requirements are not specifically related to the definition of performance targets for the portfolio. The definition of sustainability performance targets for the property portfolio constitutes an essential part of a CSR strategy in the analyzed CSR agendas (Chapter 4.1.3).

[459] Sustainability criteria in the acquisition process are explicitly demanded by Rapson et al. (2008), Pivo (Chapter 4.1.1), the analyzed CSR agendas (Chapter 4.1.3) and UNEP FI (Chapter 4.1.4).

[460] The influence of sustainability issues on property disposition is discussed in the analyzed CSR agendas (Chapter 4.1.3) and UNEP FI (Chapter 4.1.4).

process and sustainability considerations (e.g., biodiversity) in site selection. Eventually, property companies have to develop procedures that allow the comparison of the higher initial capital outlays that would be necessary to further improve a building's sustainability performance to the benefits arising from increased sustainability performance, e.g., lower running costs and higher rents. To ensure that their sustainability concerns are consistently taken into account in all development projects, property investors must formalize sustainability development guidelines. These should outline best-practice examples of the integration of sustainability issues into the property development process.[461]

Alongside the consideration of sustainability in property investment decision making, the operation and management of the property stock is of equal importance to both the financial and sustainability performance of the portfolio. For this reason, property investors must devise sustainable asset and property management strategies at the portfolio level to ensure that their sustainability concerns are considered in the operation of the properties across their entire portfolio. This necessitates the definition of sub-strategies for property letting, building management and supply chain management. The sustainability performance of properties is, on one hand, determined by physical building characteristics and the ways in which buildings are operated and, on the other hand, influenced by tenants as their main users. Accordingly, engagement with tenants has to constitute a significant element of property companies' sustainability activities to achieve improvements in the sustainability performances of their buildings.[462] Effective sustainability-oriented tenant engagement procedures include the systematic analysis of tenant needs in terms of sustainability, the provision of detailed environmental data to tenants and the development of formalized guidelines describing sustainable tenant behavior. In addition, green leases specifying sustainability obligations for both landlords and tenants are regarded as effective tools to ensure adherence of all parties to sustainable behavior.[463]

To increase the effectiveness of sustainability-oriented tenant engagement measures, property investors must simultaneously adopt sustainable building management procedures. Measures to enhance the sustainability performance of a company's property stock without

[461] The integration of sustainability issues into the property development process represents an essential part of a CSR strategy in Roberts et al. (2008) (Chapter 4.1.1) and the analyzed CSR agendas (Chapter 4.1.3).
[462] Stakeholder (tenant) engagement constitutes an essential feature of managing CSR in Rapson et al. (2008), Roberts et al. (2008) (Chapter 4.1.1), SAM Group, FTSE4Good, RiskMetrics (Chapter 4.1.2), the analyzed CSR agendas (Chapter 4.1.3) and UNEP FI (Chapter 4.1.4).
[463] Cf. British Land (2009a), p. 42; Hammerson (2009), p. 37; Land Securities Group (2009), p. 22; Investa Property Group (2007a); Stockland (2008), p. 27.

significant capital expenditures comprise the realization of regular energy efficiency audits and adjustments to ensure that plant and machinery in buildings are operating at optimum levels, the assessment of energy and waste management contracting opportunities to harness and bring in third-party expert knowledge, the development of low-cost best practice strategies to curb resource use and emissions (e.g., low energy "intelligent" lighting and water-saving devices) as well as the outlining of formalized sustainability standards for property managers to induce best practice property management procedures.[464] Beyond performing low-cost activities to improve the sustainability performance of their property stock, companies have to consider sustainability issues in their long-term capital expenditure planning. On the basis of binding sustainability targets (e.g., emission reduction targets) at the portfolio level, property companies can begin to identify value-added investments to increase the sustainability performance of individual buildings. A comprehensive process that promotes the achievement of long-term sustainability targets by means of introducing sustainability considerations into companies' capital expenditure planning has to include an ongoing and systematic identification and assessment of opportunities to upgrade the portfolio stock, the integration of environmental criteria into decision making on technical building systems upgrades and replacements, the assessment of opportunities to realize ecological design features in individual buildings (e.g., photovoltaic roof panels) and the development of asset action plans outlining possible property-specific sustainability upgrades.[465] At this juncture, property companies have to develop procedures that weigh the higher initial capital outlays that would be necessary to further improve a building's sustainability performance against the benefits arising from increased sustainability performance, e.g., lower running costs and higher rents. Approaches considering the benchmark cost for CO_2 emissions in decision making represent the foremost investment assessment methodology in the property sector.[466]

Apart from the consideration of sustainability in a company's own building management procedures, a comprehensive sustainable property portfolio management framework has to establish processes to account for sustainability issues in the procurement of goods and services. In a first step, property companies must decide on how to introduce sustainability into

[464] SAM Group, FTSE4Good, RiskMetrics (Chapter 4.1.3) and UNEP FI, CDP, ISO 14000 (Chapter 4.1.4) require the implementation of measures to improve the companies' sustainability performances without specifying practices. Rapson et al. (2008), Roberts et al. (2008), Pivo (2008) (Chapter 4.1.1) and the analyzed CSR agendas (Chapter 4.1.3) mention specific property management measures to increase the sustainability level of property portfolios in the short term.

[465] SAM Group, FTSE4Good, RiskMetrics (Chapter 4.1.3) and UNEP FI, CDP (Chapter 4.1.4) require the implementation of measures to improve CSR performance without specifying practices. Rapson et al. (2008), Pivo (2008) (Chapter 4.1.1) and the analyzed CSR agendas (Chapter 4.1.3) outline value-added investments to increase the sustainability level of property portfolios in the long term.

[466] Cf. Stockland (2009b).

their supply chain management. They can either consider the CSR performance of prospective contractors in the tender process or introduce requirements in terms of the sustainability of provided services into the contractual agreements with third-party property and facility management firms. The realization of such processes requires property companies to determine criteria and processes to assess the CSR performance of firms and to identify the management operations that should be performed in a sustainable manner. In addition, sustainable supply chain management procedures must include mechanisms to monitor whether suppliers adhere to agreed-upon sustainability principles when acting on behalf of the investor. With regard to the procurement of goods, companies have to assess the opportunities to use sustainable or "green" goods such as renewable energy. Eventually, property investors must clearly communicate their sustainability expectations to suppliers by formalizing written guidelines and conducting dedicated workshops.[467]

Finally, companies that seek to implement a comprehensive sustainability strategy must publicly communicate their sustainability performances and activities. Such communication requires the determination of the scope and content of sustainability reporting, the identification of where to provide dedicated information and the realization of external verification of reporting. At this juncture, companies must ensure that their sustainability reporting provides sufficient meaningful information to allow external stakeholders to understand the companies' sustainability approaches. In particular, they should draw on quantitative data to demonstrate the effectiveness of their sustainability initiatives.[468]

The following table summarizes the elements of a sustainable property portfolio management process as described in this chapter. The sustainability strategies and mechanisms are aligned with the portfolio management process outlined in Chapter 2 (see Table 3). This alignment ensures the present framework is connected to a company's established business management activities and procedures. Chapter 5 seeks to verify and ensure the plausibility of this process by investigating its suitability for German property investors. Moreover, it provides information on the design and functionality of individual sustainability mechanisms.

[467] The consideration of sustainability issues in the procurement of goods and services constitutes an essential part of approaching sustainability in Rapson et al. (2008), Roberts et al. (2008) (Chapter 4.1.1), SAM Group, FTSE4Good, RiskMetrics (Chapter 4.1.2), the analyzed CSR agendas (Chapter 4.1.3) and UNEP FI, GRI (Chapter 4.1.4).

[468] External reporting constitutes an essential requirement of a CSR initiative in Rapson et al. (2008), Roberts et al. (2008) (Chapter 4.1.1), Sam Group, FTSE4Good, RiskMetrics (Chapter 4.1.2), the analyzed CSR agendas (Chapter 4.1.3) and UNEP FI, CDP, ISO 14000, GRI (Chapter 4.1.4).

Table 16: Structure of a sustainable property portfolio management process

Traditional property portfolio management process	Procedural steps of a real estate specific sustainability approach	Sustainability mechanisms and activities
Strategic and Organizational Aspects		
Policy		
➢ Definition of an overall investment philosophy and portfolio policy ➢ Determination of portfolio objectives and targets ➢ Determination of a target portfolio allocation	➢ Development and disclosure of a portfolio sustainability policy ➢ Determination of sustainability targets	➢ Determine the scope and content of the company's sustainability policy by conducting sustainability materiality analysis to identify relevant sustainability drivers and to ensure that the sustainability policy refers to all key issues ➢ Determine opportunities evolving from the sustainability agenda and identify practices to reap benefits ➢ Determine long-term and annual sustainability targets ➢ Disclose CEO/Board statement articulating the company's views on sustainability and climate change to underpin the company's commitment to sustainability ➢ Develop and disclose a formal statement of the company's sustainability policy
Organizational Structures		
➢ Provision of human resources ➢ Engagement	➢ Establishment of internal governance structures for sustainability ➢ Engagement with sustainability industry organizations and support of networks	➢ Specify responsibilities and leadership positions by means of creating a specific department or employing or tasking specific employees for managing sustainability ➢ Link employees' compensation to the attainment of CSR goals ➢ Specify the overall responsibility for sustainability within the company's hierarchy ➢ Assess knowledge and capabilities of internal managers and provide education and training to portfolio/asset/property managers in terms of sustainability in order to improve the sustainability performance of real estate assets ➢ Provide a framework to continuously disseminate best practice information among employees and support and conduct research on related themes ➢ Engage in and support sustainability and real estate industry organizations and initiatives (e.g., Global Reporting Initiative, Green Building Councils, RICS) and discuss with policy makers possible responses to climate change (e.g., taxation)
Definition of Risk Management Processes		
➢ Implementation of a risk management process to identify, assess and control risks	➢ Implementation of a process to identify and assess significant impacts of sustainability on the company's business operations ➢ Implementation of a framework for reviewing a company's sustainability approach ➢ Outlining and implementation of an EMS that provides a framework to manage and respond to environmental risks	➢ Determine potential risks resulting from newly evolving sustainability issues for the standing portfolio stock as well as for the property development process and identify appropriate risk indicators to monitor risks and assess their financial impact ➢ Develop structures for monitoring and reviewing the company's sustainability policy and performance data by implementing internal reporting and compiling internal progress reports. Particularly review the application of formal sustainability guidelines in day-to-day management procedures ➢ Implement an EMS that ensures business operations within policies and laws, supports the collection of environmental performance data and supports monitoring, benchmarking and analysis of measured data. Coverage of an EMS should comprise the following: • Standing investments

		• Property development activities ➢ Pursue external audit or external certification of the company's EMS (e.g., ISO 14001, EMAS) ➢ Participate in externally managed CSR benchmarking activities (e.g., DJSI or CDP)
Performance Measurement and Monitoring		
➢ Identification and measurement of indicators that affect portfolio risk and performance ➢ Ongoing target-performance comparison ➢ Performance benchmark with competitors ➢ Definition of property valuation framework	➢ Identification, measurement and monitoring of environmental and social performance indicators ➢ Definition of a framework for analyzing and interpreting data	➢ Measure and monitor quantitative environmental performance metrics of the investment portfolio and of property development activities. This segment must cover: • GHG emissions • Energy use • Water • Waste • Material/resource use ➢ Determine the coverage of and appropriate tools for data collection and measurement (e.g., sub-meters) ➢ Store, analyze and benchmark measured data and measure emissions and resource use reductions as well as the financial effects of abatement strategies and projects ➢ Determine and use tools to assess the sustainability of qualitative building design features ➢ Ensure external audits of measured data
Determination of Sustainability Strategies for the Execution of Investments		
Property Transactions		
➢ Determination and implementation of an acquisition strategy ➢ Determination and implementation of a property retention and disposition strategy	➢ Incorporation of sustainability issues into investment decision making processes	➢ Determine sustainability performance targets at the portfolio and property levels ➢ Integrate sustainability requirements into the property acquisition process by: • Identifying criteria, indicators or sustainability rating tools to assess the sustainability performance of investment proposals and defining minimum requirements • Formalizing the integration of sustainability requirements into the acquisition process by means of documenting standardized processes in manuals ➢ Determine a framework for the consideration of sustainability in property disposition by: • Defining to what extent sustainability issues are considered in property disposition • Identifying sustainability criteria and indicators that are considered in the property disposition process
Property Development		
➢ Determination and implementation of a property development strategy	➢ Incorporation of sustainability issues into product/property development	➢ Identify criteria, indicators or sustainability rating tools for the determination of minimum requirements for property development projects in terms of sustainability ➢ Devise and implement a framework for the consideration of the following sustainability issues in the property development process: • Use of sustainable materials • Minimize resource use • Biodiversity issues • Waste management at development sites

Property Development		
		➢ Assess benefits of certifying property developments ➢ Assess opportunities and benefits of integrating ecological design features (e.g., photovoltaic roof panels) and on-site low-carbon energy sources into property developments ➢ Develop procedures that permit the comparison of the higher initial capital outlays that would be necessary to further improve a building's sustainability performance against the benefits arising from increased sustainability performance ➢ Formalize the integration of sustainability requirements into the property development process by developing best practice development process manuals ➢ Employ external sustainability consultants to ensure state-of-the-art development outcomes ➢ Engage with communities around development projects to ensure acceptance and appropriateness of property developments
Portfolio Strategies for Asset and Property Management		
Property Letting		
➢ Determination and implementation of a strategy for managing property letting	➢ Stakeholder engagement in property operations, in particular tenant engagement	➢ Systematically analyze tenant needs with regard to sustainability ➢ Develop formalized written guidelines outlining sustainable tenant behavior and provide further possibilities for tenants to get advice on reducing their carbon emissions (e.g., Green Travel Plans, Sustainable Fit-Out Guide) ➢ Ensure tenant adherence to sustainable behavior by adapting contractual obligations, e.g., green leases, or incentivize sustainable tenant behavior ➢ Provide environmental consumption data to tenants
Building Management		
➢ Determination of a strategy for organizing building management	➢ Advancement of the operational sustainability performance of the property stock in the short term by means of conducting low-cost sustainability improvements ➢ Advancement of the sustainability of the property stock in the long term by considering sustainability issues in the long-term planning of capital expenditures	➢ Set short-term emissions and resource use reduction targets at the portfolio and property levels ➢ Develop building management processes and procedures to minimize energy consumption, resource use and waste. Essential elements of a comprehensive approach include the following: • Regularly conduct audits and energy efficiency adjustments to the plant and machinery in buildings • Develop and implement low-cost best practice strategies to curb resource use and emissions (e.g., low-energy "intelligent" lighting, water-saving devices), • Harness third-party knowledge by assessing energy and waste contracting possibilities • Develop property maintenance plans that account for sustainability issues ➢ Develop and formalize standards and written guidelines for property management, e.g., sustainability manuals for property managers, waste management plans and community engagement plans ➢ Set long-term emissions and resource-use reduction targets at the portfolio and property levels ➢ Systematically identify opportunities and best options to enhance sustainability performance of the property stock and incorporate them into long-term capital expenditure planning. A comprehensive approach aims to: • Identify and integrate environmental criteria into the decision-making process regarding technical building systems replacements (e.g., windows, boilers, air-conditioning systems)

		• Assess opportunities to implement ecological design features (e.g., photovoltaic roof panels) and on-site low-carbon energy sources • Develop sustainability asset action plans in which investments and upgrades to improve the sustainability performance of the property stock are analyzed and planned on a property-by-property basis ➢ Develop procedures that permit the comparison of the higher initial capital expenditures that would be necessary to further improve a building's sustainability performance against the benefits arising from increased sustainability performance
Management of service provider		
➢ Determination and implementation of a strategy for the selection and management of service providers (e.g., spectrum of services, controlling and monitoring)	➢ Consideration of sustainability issues in the procurement of goods and services	➢ Determine criteria and processes for assessing the CSR performance of prospective contractors ➢ Demand sustainability in the requested spectrum of services, e.g., ask external service providers (e.g., property and facility managers) to integrate sustainability into their management operations, e.g., "green" cleaning services ➢ Assess the opportunities to procure "green" goods, e.g., to use renewable energy ➢ Ensure adherence of suppliers to pre-defined sustainability standards ➢ Formalize sustainable procurement guidelines and conduct workshops with suppliers and service providers to communicate the company's expectations in terms of sustainability
Definition of a Reporting Framework		
➢ Definition of an external reporting framework ➢ Realization of external auditing	➢ Realization of sustainability reporting	➢ Determine the framework and standards for the external reporting of the company's sustainability performance by • Defining the way to communicate its sustainability performance • Determining the scope and content of reporting ➢ Realize the independent assurance and validation of the company's sustainability reporting

Source: Own Compilation

4.3 Barriers to the Adoption of Sustainability Practices in Property Portfolio Management

4.3.1 Lack of Tools and Knowledge

Mainstreaming CSR in the business community, particularly inducing real estate market participants to voluntarily adopt CSR issues within their business operations, requires providing the business case for CSR and sustainable buildings.[469] CSR and sustainability have, however, only recently begun to attract increased attention in the property industry. For this reason, there is little knowledge of the financial impacts of the sustainability agenda on property investments and property investment companies.

Above all, there exists no evidence on the effects of the increased importance of sustainability on buildings' market values. Although preliminary studies indicate financial benefits for certified properties, these benefits should not be interpreted as evidence of actual premiums.[470] Whether there will be a future premium for more sustainable buildings or a future discount for non-sustainable buildings is highly uncertain. Therefore, the business case for investments in sustainable real estate currently rests on risk reduction and not on proven economic benefits. The main impediment to investors' recognizing the business case arises from the lack of a system to consider sustainability within the appraisal of commercial property. With no means of measuring the effect of sustainability or of determining its potential impact on property worth, the market has been unable to discern a clear business case. For this reason, both scholars and real estate market participants suppose property valuation to play a major role in transforming existing market behavior and in promoting sustainability in the real estate industry.[471] In this context, Sayce et al. (2007) suggested that appraisers were not yet building sustainability into their appraisal calculations.[472] Likewise, Dixon et al. (2008) reported that property surveyors were less engaged in the sustainability agenda compared to professionals in other real estate disciplines.[473] Following Lützkendorf and Lorenz

[469] For an in-depth discussion of the importance of sustainability drivers in the real estate sector, see Chapter 3.1.2.
[470] For an in-depth discussion of studies analyzing impacts of sustainability certification on property market values, see Chapters 3.4.1 and 3.5.
[471] Cf. Lorenz, D. P./Lützkendorf, T. (2008), p. 82; RICS Research Foundation (April 2007), p. 1; Sayce, S., et al. (2007), p. 629; Lorenz, D. P., et al. (2007), p. 119; Lützkendorf, T./Lorenz, D. P. (2005), p. 212; Pett, J./Ramsay, L. (2003), p. 737.
[472] Cf. Sayce, S., et al. (2007), p. 639.
[473] Cf. Dixon, T., et al. (2008a), p. 473.

(2005), major questions that come up when discussing sustainability aspects in property valuation are as follows:[474]

- What adjustments must be made to rental growth forecasts for sustainable properties?
- What risk premiums are appropriate for non-sustainable buildings with high energy use if increasing energy costs are considered?
- What is the risk level for future vacancy in sustainable compared to non-sustainable buildings?
- To what extent is it necessary to adjust discount rates to reflect a higher stability of cash flows due to the improved marketability of more sustainable buildings?

Finally, the incorporation of sustainability into property valuation constitutes a prerequisite for highlighting the value added by sustainable buildings and promotes the mainstreaming of sustainability in the real estate sector. If sustainability is not built into appraisal calculations, the business case for sustainability continues to lack transparency. Thus, the challenge lies not in developing a new and special valuation approach but in demonstrating how sustainable properties perform better under the existing methods.[475] In response to the lack of consideration of sustainability in property valuation, several industry organizations have begun to develop specific guidelines. For example, in 2009, the Royal Institution of Chartered Surveyors (RICS) published its Valuation Information Paper 13 that addresses sustainability in commercial property valuation.[476] However, a broad consensus and market standard have not been reached so far.

In addition to shortcomings in the incorporation of sustainability issues into property valuation, there exists a lack of consensus on what strategies and practices characterize comprehensive and good management of CSR issues in property companies.[477] The previous chapters reveal that several initiatives have been launched to promote the implementation of CSR practices into companies' business operations. However, none of these initiatives provide a rigorous and comprehensive framework for the consideration of CSR issues in property investment and management operations. The failure to define a widely accepted real estate-specific sustainability framework that outlines relevant strategies, tools and measurements has prevented the establishment of the CSR-financial performance link in the property sec-

[474] Cf. Lützkendorf, T./Lorenz, D. P. (2005), p. 220.
[475] Cf. RICS Research Foundation (April 2007), p. 6.
[476] Cf. RICS (2009a).
[477] For an in-depth discussion of CSR see Chapter 2.1 and Chapter 4.1.1.

tor.[478] For this reason, property companies hesitate to address sustainability comprehensively in a broad sustainability approach.

Aside from a lack of knowledge on sustainability issues, deficiencies in personal know-how can create a barrier to the adoption of CSR and sustainable building practices. In this regard, a few surveys on market participants' involvement in sustainability indicate that a lack of knowledge and a lack of expertise are the two most important barriers impeding the uptake of sustainability tools in real estate practice.[479] Moreover, market participants systematically overestimate the likely cost premium for certified buildings. At the same time, they underestimate buildings' contributions to greenhouse gas levels.[480] Some scholars also suggest that real estate investors do not yet consider sustainability because they have not recognized the profitable environmental investment opportunities that their buildings provide.[481] However, the range of economically beneficial investment opportunities in a building depends on its (future) individual circumstances (e.g., location, building quality, tenant requirements and lease terms) and future external developments (e.g., energy costs). Accordingly, such investments bear considerable risks for property owners. To the best of the author's knowledge, there is no research that empirically investigates the risk-return profile of individual environmental investment opportunities while also taking into account the individual characteristics of buildings (e.g., location, building quality, building age, regional building codes and tenants).

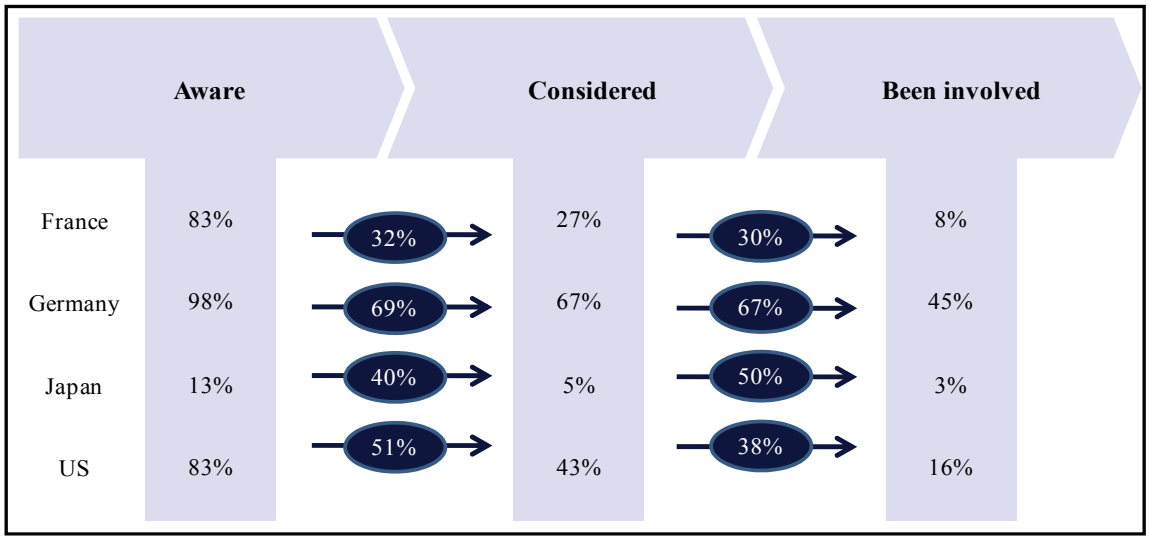
4.3.2 Economic Obstacles and Lack of Corporate Conviction

Shortcomings in evaluating the impacts of sustainability on the economic performance of both individual buildings and property companies have led to a lack of acceptance and corporate conviction. This problem is reflected in real estate market players' high awareness of sustainability and the sharp drop in the number of market participants involved in sustainable building activity and CSR (see Figure 13).[482] The awareness and involvement of different market participants varies significantly. For example, Dixon et al. (2008) showed that

[478] For an in-depth discussion of CSR, see Chapter 2.1 and Chapter 4.1.1.
[479] Cf. Dixon, T., et al. (2008a), p. 472; World Business Council for Sustainable Development (July 2008), p. 35.
[480] Cf. World Business Council for Sustainable Development (July 2008), p. 35.
[481] Cf. Kok, N., et al. (2010), p. 11; UNEP Sustainable Buildings & Construction Initiative (2007), p. 7.
[482] Cf. World Business Council for Sustainable Development (July 2008), p. 36.

property investment management lagged other disciplines in the real estate sector in terms of level of engagement with the sustainability agenda.[483]

Figure 13: Level of sustainability awareness



Source: World Business Council for Sustainable Development (July 2008), p. 37.

The lack of corporate conviction arises not only from investors' lack of awareness of profitable investment opportunities (e.g., energy efficiency investments) that are hidden in their buildings but also from economic obstacles. Currently, real estate markets do not offer the right incentives for property investors to improve the energy performance of their buildings. In particular, the majority of tenants neglect sustainability issues and energy costs. Investors thus hesitate to adopt sustainable management practices and view the payback times of energy efficiency investments as too long.[484]

4.3.3 Barriers in the Leasing Structure

Another barrier impeding property investors from working more actively toward improving the sustainability performance of their portfolio stock emerges from lease patterns and from the arrangement of lease contracts.[485] The impact of rising energy costs and resulting higher running costs of a property depend on whether the tenant is responsible for the energy costs (net lease) or the owner is liable for the operating expenses (gross lease).[486] Assuming a gross lease, owners of energy-efficient buildings may incur lower operating costs relative to

[483] Cf. Dixon, T., et al. (2008a), p. 474.
[484] Cf. Kok, N., et al. (2010), p. 11; Cushman & Wakefield (Spring 2009), p. 15; UNEP Sustainable Buildings & Construction Initiative (2007), p. 7; Pett, J./Ramsay, L. (2003), p. 733.
[485] Cf. UNEP Finance Initiative (March 2009), p. 11; Hinnells, M., et al. (2008), p. 544; UNEP Sustainable Buildings & Construction Initiative (2007), p. 7; Sayce, S., et al. (2007), p. 634; Morrison Hershfield (2005), p. 37; Pett, J./Ramsay, L. (2003), p. 737.
[486] Cf. Geltner, D., et al. (2007), p. 808.

owners of buildings with poor energy efficiency. Thus, they may be able to accept a discount in rental level if there is a phase of price competition and void periods, or they may capture the savings and, in this way, increase their cash flows. In turn, there are no incentives for tenants to reduce their energy demand. Assuming a net lease, the operational savings associated with an energy-efficient building accrue to tenants. In theory, they may be willing to pay a rental premium relative to comparably less energy-efficient buildings. Hypothesizing existing lease arrangements, there are few incentives for owners to further improve the energy efficiency of their existing properties as it is only at the lease end that lease arrangements are negotiated.[487]

Accordingly, when evaluating the importance of lower operating costs and higher energy prices as drivers of sustainability, the arrangement of leases and especially the agreements on how the property costs are divided between the lessee and the lessor are of importance. From a legal perspective, the leasing structure is not a barrier, but the commercial structure is.[488] These theoretical considerations have to be regarded against the background of net rent contracts dominating the property market.[489] For this reason, some scholars, including McNamara (2009), Hinnells et al. (2008) and Lucuik (2005), argued that current commercial leases ignore the environmental sustainability dimension through the uneven distribution of costs and benefits between owners (investors) and occupants and the fact that many leases have fixed rates regardless of energy or water consumption.[490] In some property markets, this situation is exacerbated by the lack of detailed metering by space so that neither owners nor lessees can easily obtain information on consumption patterns.[491]

Current lease structures require landlords to provide capital costs for energy efficiency investments, whereas tenants receive the benefits. Because the majority of tenants pay only little attention to operating costs, a great number of investors are reluctant to improve the energy efficiency of their portfolio stock. In response to this eco-efficiency principal agency problem, both market participants and academics advocate the development of some form of

[487] Cf. Kok, N., et al. (2010), p. 13; Ciochetti, B. A./McGowan, M. D. (February 2009), p. 25; Fuerst, F./McAllister, P. (April 2009), p. 9.
[488] Cf. Cardiff University/Centre for Research in the Built Environment/British Council for Offices (July 2009), p. 8.
[489] See Chapter 3.2.3.
[490] Cf. UNEP Finance Initiative (March 2009), p. 11; Hinnells, M., et al. (2008), p. 544; Morrison Hershfield (2005), p. 37.
[491] Cf. Pett, J./Ramsay, L. (2003), p. 735.

shared-savings lease contracts.[492] Accordingly, some property companies have started to develop green leases to further propel the sustainability agenda in their investment property portfolio.[493] The use of energy performance contracting models represents another approach to overcoming investors' reluctance to invest in energy efficiency.[494] There are different opportunities for arranging such models. Energy performance contracting regularly includes the engagement of an external energy service company that provides the design, commissioning, financing, maintenance and monitoring of energy efficiency technologies (e.g., the replacement of inefficient heating equipment) for buildings.[495] The savings obtained from the project contribute to financing the investment cost. The major benefits that property investors' receive for adopting energy performance contracting include reduced up-front capital costs for building improvements, reduced operating costs and access to expert knowledge for the maintenance and operation of equipment. In particular, it is possible to share some of the burden of the costs associated with the energy efficiency improvements with a building's tenants.[496]

4.4 Section Summary

In response to the lack of a comprehensive real estate-specific sustainability framework (see Chapter 2), Chapter 4 aims to identify strategies and mechanisms to address the most important sustainability issues in property portfolio management. Such a framework is a prerequisite for the mainstreaming of sustainability in the business community as well as for research on the CSR-financial performance link. For CSR to become a source of innovation and competitive advantage requires that potential sustainability strategies and mechanisms be aligned and linked to a company's business strategy and activities and that the drivers of sustainability in the real estate sector (see Chapter 3) be taken into account. Finally, the proposed sustainable property portfolio management framework is not meant to be prescriptive. Rather, it aims to provide guidance for interested property investors on how to embrace and integrate sustainability issues into the management of their property stock.

The present chapter draws on four different sources of information (CSR frameworks proposed in the academic literature, third-party CSR rating schemes, CSR initiatives of leading

[492] Cf. UNEP Finance Initiative (March 2009), p. 11; UNEP Finance Initiative (2008a), p. 4; Hinnells, M., et al. (2008), p. 544; International Energy Agency (2007), p. 55; Morrison Hershfield (2005), p. 37.
[493] Chapter 4.1.3 shows that international property companies leading in the CSR area are actively working to implement green leases.
[494] Cf. Quint, R. (2009), pp. 215 et seqq.; Weinen, S. (2008), pp. 77-110.
[495] Cf. ICF International/National Association of Energy Services Companies (2007), pp. 5-7.
[496] Cf. Weinen, S. (2008), pp. 77-110.

property companies and sustainability standards NGOs' CSR initiatives) to identify strategies and mechanisms for the consideration of sustainability in a company's business operations. This analysis shows that there is scant literature providing insight into sustainable management procedures, in particular for the real estate sector. Moreover, the existing literature is often subject to criticism. For example, previous academic research draws solely on companies' public domain information and questionnaire surveys to discuss companies' sustainability activities. In addition, scholars have widely neglected the establishment of a link between companies' sustainability practices and their business strategies and operations. Furthermore, the variety of third-party CSR ratings and the diversity of assessment criteria used in these ratings have contributed to increased confusion in the marketplace rather than propelling the mainstreaming of sustainability. Finally, companies' CSR reports frequently lack a coherent strategic framework for sustainability and thus provide information in a manner that is hard to understand and compare. Despite these shortcomings, the analysis of the aforementioned information sources forms the basis for devising the structure of a sustainable property portfolio management framework in this dissertation. First, they constitute the only available information sources. Second, despite several deficiencies, they allow the identification of relevant sustainability strategies and mechanisms. Otherwise, these shortcomings highlight the need for developing a sustainability framework that is specifically adapted to the peculiarities of the real estate sector.

Chapter 4.2 merges the sustainability strategies and mechanisms that were identified in Chapter 4.1 and, on this basis, outlines the structure of a sustainable property portfolio management framework. The fundamental structure consists of two different levels. First, the strategic level provides the frame that constitutes the fundamental pillars of the realization of a sustainability approach in property portfolio management. The second level proposes mechanisms for the introduction of sustainability management procedures in day-to-day management operations. In this way, the quality of the property stock and the management quality and capabilities of the company are of equal importance. Having devised a real estate-specific sustainability framework, Chapter 4.3 analyzes reasons why property investors are reluctant to adopt and implement holistic sustainability management approaches.

5 Strategies and Mechanisms in Sustainable Property Portfolio Management

The following chapters examine the viability of the sustainability strategies and mechanisms proposed in Chapter 4.2. For this purpose, the present study conducted expert interviews with German property investors. Expert interviews are generally regarded as the most appropriate tool for the study of new, relatively less-researched topics. In particular, they reveal the interdependencies between a company's established management operations and its sustainability management efforts.[497] This approach addresses one of the major shortcomings of the previous academic research. Until now, scholars have managed to only inadequately link companies' environmental management procedures with their established business policies and operations; this is because the scholars either drew on publicly available company documentation or conducted formalized questionnaire surveys to investigate the sustainability endeavors of property investment companies.[498] To ensure consistency with the previous chapters of the present dissertation, the interview guide for questioning the interviewees has been aligned to fit the structure of the proposed sustainable property portfolio management framework. Apart from reviewing the plausibility of the proposed framework, Chapter 5 presents additional information on the mode of operation of the sustainability strategies and mechanisms that equip property investors to manage sustainability in property portfolios.

5.1 Strategic and Organizational Aspects of a Sustainable Property Portfolio Management Framework

5.1.1 Fundamentals of a Sustainability Policy

5.1.1.1 Inception of a Sustainability Policy

The proposed sustainable property portfolio management framework suggests the formulation of a sustainability policy as a starting point for the introduction of sustainability features in a company's business operations.[499] A discussion on the development and implementation of a sustainability policy necessitates the differentiation between explicit and implicit poli-

[497] The major advantage of conducting interviews is that they allow access to detailed and exclusive expert insight while taking into account different levels of knowledge and varying understanding of relevant issues. Moreover, interviews enable researchers to simultaneously investigate a broad range of topics. Hence, interviews are extremely valuable in studies researching new and relatively less-analyzed topics; see Chapter 1.2.

[498] See Chapter 4.1.

[499] See Chapter 4.2.

cies. The former is the result of a formal planning process, while the latter evolves implicitly through the activities of the various functional departments of a firm. The academic literature increasingly provides evidences of the significant benefits that arise from an explicit process of strategy formulation.[500] With regard to sustainability, the research by Kok et al. (2010) indicated that a strong environmental performance is no coincidence, as the implementation of environmental management procedures is mostly the result of an explicitly formulated top-down policy. Only 2% of this study's respondents implemented sustainable portfolio practices without having a sustainability policy in place.[501]

Property investment companies generally have well-defined investment policies. They comprise sets of general principles that guide an investor's behavior and determine an investor's major financial objectives and preferences.[502] This approach entails that property investors frequently focus on specific property categories in terms of building quality (e.g., core, value-added, opportunistic or class A, class B, class C) and property type (e.g., office, retail, residential or industrial). Hence, property investors eventually have some kind of homogeneous property stock that is characterized by similar building attributes. In this context, the interview results indicate that property investors' sustainability efforts depend on their respective overall investment policies and their property stock. This fact has to be attributed to the influence of the property portfolio stock on an investor's perception and assessment of sustainability drivers and to the importance of specific sustainability issues that varies according to different categories of building quality and property type. Accordingly, the reviewed investors' sustainability approaches differ widely.

Property companies with a primary investment focus on core-plus or prime premises advocate a comprehensive sustainability management approach that rests on an explicitly formulated sustainability policy and encompasses a broad range of themes and activities.[503] The increasing importance of sustainability for property occupants presents the main impetus for the companies that consider the sustainability agenda more extensively and in a strategic manner in their business operations. Accordingly, these investors actively work toward the realization of superior environmental management procedures because they treat such pro-

[500] Cf. Porter, M. (1980), pp. 3 et seqq.
[501] Cf. Kok, N., et al. (2010), p. 37.
[502] Cf. Geltner, D., et al. (2007), p. 124; Pyhrr, S. A., et al. (1989), pp. 86 et seqq.; see also Chapter 2.2.
[503] See Interviews; the property stock of this group of investors tends to be younger and in very good locations. Their tenant base frequently encompasses a substantial number of large multinational companies. Chapter 5.1.1.2 discusses the sustainability themes and activities that are considered in property companies' sustainability policies.

cedures as a prerequisite to ensuring the long-term marketability and competitiveness of their property stock.[504] In addition, they expect to reap financial benefits in the form of reduced energy costs, rent premiums, lower rent incentives and shorter void periods.[505] The development of a comprehensive sustainability management approach requires property companies to extend and deepen their knowledge, analysis and work streams across a broad range of investment and management activities. Therefore, formulating an explicit sustainability policy facilitates the coordinated implementation and continuous advancement of these efforts.

In contrast, owners of medium-quality buildings or value-added buildings typically do not take measures to formally consider sustainability issues based on a more holistic approach than their current management procedures.[506] This, however, does not mean that they entirely neglect sustainability issues in the management of their property stock. Instead, they implicitly deal with environmental and social issues in their ordinary asset and property management operations. At this juncture, however, their efforts mainly comprise limiting the rise of energy costs in phases of energy price appreciation and thus maintaining service charges at acceptable levels. Rather than actively working toward implementing management procedures to systematically reduce energy consumption, they pursue a passive approach that leads to concrete actions only if the energy costs directly affect the tenant's satisfaction or willingness to pay. Accordingly, the absence of an explicitly formulated sustainability policy leads to a less detailed examination of sustainability issues in the property stock and to a lack of strategies or processes that aim to continually improve the sustainability performance of a portfolio. These investors hesitate to adopt more proactive and comprehensive sustainability measures because their tenants show very little interest in sustainability. Consequently, this group of investors appears to believe that implementing more holistic and detailed sustainability management procedures that go beyond the existing management operations will increase costs without providing measureable economic benefits.[507] These findings are par-

[504] The level of sophistication of the companies' sustainability management procedures varies considerably as many companies have only recently started to address sustainability in a strategic manner.

[505] See Interviews; investors particularly expect to reduce energy costs, void periods and tenant incentives. They expect to realize higher rents only in very exceptional cases.

[506] See Interviews; the majority of the property stock of this group of investors is generally older and situated in less central locations. Hence, their tenants are more likely to be small and medium enterprises. However, this does not mean that their property stock has significant vacancies or necessarily needs extensive upgrades.

[507] See Interviews; in this context, the interview results reveal the importance of establishing a common understanding of the term "sustainability" when investigating the environmental management procedures of property investors. Companies that have not implemented an explicit policy often address sustainability issues (e.g., energy consumption) within their ordinary asset and property management procedures and do not classify or perceive these practices to be part of the sustainability agenda. For this reason, research that ana-

ticularly surprising because energy costs account for a greater proportion of rental costs in medium-quality buildings than in more expensive premium buildings. This fact should actually make investors and tenants more concerned about the level of energy consumption.

Apart from the quality of the property portfolio stock, the investment horizon and regional diversification of the investment activities of property companies appear to be important for the formulation of a formal sustainability approach. Companies that have longer holding periods appear to embrace stricter and more comprehensive sustainability management procedures based on an explicitly formulated sustainability policy.[508] The influence of the investment horizon and target return also reflects, for example, in property funds managed by the same investment company taking different measures to improve the sustainability performance of the funds' properties.[509] Likewise, investment vehicles operating internationally are more likely tend to adhere to dedicated, holistic sustainability policies. This fact is related to their experiences in foreign investment markets, which affect their perception and assessment of potential sustainability drivers (particularly in terms of future legislation and future tenant requirements).[510] It is worth noting that the quality of an investor's property stock and the international diversification of a property company's portfolio often coincide with the company's volume of assets under management.[511] This argument would be in line with Kok et al. (2010), whose findings show positive correlations between companies' environmental performances and portfolio size.[512] The interviewees, however, mainly assert that their actions or hesitation to proactively and comprehensively propel environmental management depend on the requirements that arise from the quality of their property stock and

lyzes the sustainability performance of property companies by using standardized questionnaires can easily be biased.

[508] See Interviews; these interviewees highlight the long-term investment perspective of German open-ended property funds. At the same time, these funds take a very proactive stance in addressing the sustainability agenda; the interviewees generally suppose that the sustainability agenda is of greater importance for investors that have a long-term investment perspective.

[509] See Interviews.

[510] See Interviews; the primary reasons that strengthened companies' decisions to adopt sustainability management procedures include, for example, the Australian government's preference for renting certified properties, the Australian government's decision to sign only green leases and the French government's introduction of green leases. At this juncture, it is necessary to differentiate between German companies that invest abroad and German companies that are part of a foreign parent company. The interview findings suggest that merely belonging to a large, international parent company does not automatically imply that a property company will employ a proactive sustainability approach, even if the parent company is highly engaged in the sustainability agenda.

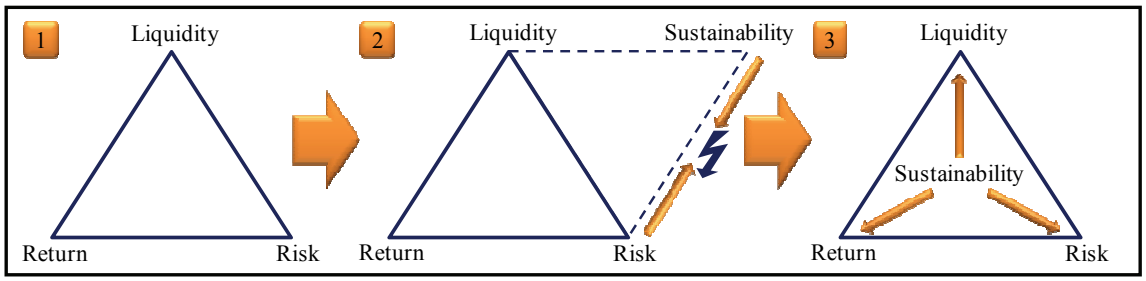
[511] The surveyed companies that take a proactive stance in the management of sustainability issues in their property portfolios are also those that have the largest volume of assets under management.

[512] Cf. Kok, N., et al. (2010), p. 32; it is worth noting that the study by Kok et al. (2010) does not take companies' investment policies and portfolio structures into consideration.

associated stakeholder (particularly tenant) needs.[513] The present dissertation cannot empirically establish the link between a firm's investment policy and its sustainability approach. However, the considerable volume of assets under management of property companies that have not taken specific steps to implement a formal sustainability management approach because of the quality and requirements of their property stock further strengthens the hypothesis of this relationship.[514]

A company's formulation of an explicit sustainability policy and adherence to it underpins the company's willingness to recognize sustainability as an economic and competitive opportunity and source for innovation, not as an annoying cost or an inevitable threat. On the one hand, this implies the integration of sustainability in a property investor's various concerns (see Figure 14). On the other hand, the realization of (economic) benefits constitutes a necessary condition for companies' willingness to adopt sustainability management procedures. The interviewees as well as the reviewed CSR reports highlight the fact that the potential measures to improve the sustainability performance of the portfolio stock inevitably have to foster the company's long-term profitability in order to be considered for implementation.[515]

Figure 14: Integration of sustainability issues into a company's investment policy



Source: Lorenz, D. P. (2008), p. 15.

This interpretation of sustainability describes the application of the "resource-based view of the firm" theory to the property investment and management context.[516] Such a mind-set necessitates that the processes and mechanisms formulated for improving the sustainability performance of the property stock are properly embedded in the company's established work streams and overall process of increasing productivity and competitiveness. Altogeth-

[513] See Interviews.
[514] See Interviews.
[515] See Interviews; see also British Land (2009a), p. 4; Hammerson (2009), p. 1; Land Securities Group (2009), p. 9.
[516] See Chapter 3.3.1; see also Ireland, D. R., et al. (2009), pp. 16–17; Haberberg, A./Rieple, A. (2008), pp. 284 et seqq.

er, corporate conviction in the form of recognizing sustainability as an opportunity to enhance the company's operational productivity and competitiveness represents a key prerequisite for the implementation of strategic and coherent environmental management procedures.

5.1.1.2 Process of Sustainability Policy Formulation

Defining the rationale behind the consideration of sustainability in its business operations enables a company to develop a sustainability policy that is specifically aligned to its investment policy. The present chapter draws on three different information sources—the academic strategic management literature, the sustainability activities identified in Chapter 4 and the study findings from the interviews—to compile the details of the process of sustainability policy formulation. Its components, as outlined in Chapter 4.2, comprise the following:[517]

- Realizing a sustainability materiality review to identify the most important sustainability drivers and to determine the opportunities evolving from the increasing importance of sustainability
- Determining the scope and content of a sustainability policy
- Determining long-term and annual sustainability targets
- Developing and disclosing a formal sustainability policy statement

5.1.1.2.1 Corporate Sustainability Materiality Review

The purpose of a corporate sustainability materiality review is to detect not only the enduring sustainability themes that have a material impact on a company's business operations but also those that are materially affected by a company's operations.[518] In the first step, this approach requires an audit of the external and internal environment of a company's businesses. In general, an external audit involves analyzing the economic, social, demographic, environmental, political, legal, governmental, technological, and competitive forces of the relevant industry sector. This investigation includes ranking the various catalysts for change in the external environment in terms of their relevance for a company. An internal audit involves investigating a company's activities, resources and capabilities to respond to changes in the external environment.[519]

[517] See Chapter 4.2.
[518] See Chapter 4.2; see also Pricewaterhouse Coopers/Craib Design & Communications (2010), pp. 10–11; Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (2009), pp. 1–4; Global Reporting Initiative (2006), pp. 8–9.
[519] Cf. Ireland, D. R., et al. (2009), p. 37; Haberberg, A./Rieple, A. (2008), p. 103; David, F. R. (1995), p. 116.

A property company can use a broad range of approaches and tools to identify the relevant sustainability issues in its external and internal environment. Property investors can utilize a top-down assessment process based on screening the sustainability themes and requirements in accreditation schemes in which the company seeks to participate or through which it can be certified (e.g., GRI, CDP, UN PRI, DJSI or FTSE4Good), examining the sustainability approaches of rivals, investigating sustainability issues in other industry sectors (e.g., legislation and corporate actions) and scrutinizing foreign environmental legislation.[520] By conducting an analysis of these information sources, property companies can obtain a good overview of the most important sustainability issues affecting the property sector in the long run. However, a corporate sustainability materiality review cannot limit itself to solely a stand-alone top-down analysis since a multitude of factors (e.g., the specific investment focus of an investor, characteristics of an investor's property stock and legislation in markets in which a company operates) lead to differences in the importance of particular sustainability issues for individual property investors. Accordingly, the top-down assessment has to be supplemented by a bottom-up analysis to ensure that a company's most relevant sustainability issues are identified.

There exists a wide array of opportunities to perform a bottom-up sustainability analysis. First, some property investors investigate extensively the importance of individual sustainability drivers (e.g., the sustainability certification of buildings) while working on or dealing with the development, revitalization or letting of certain buildings.[521] At this juncture, their efforts comprise examining the sustainability characteristics and performance of the local building stock, determining the sustainability demands and willingness to pay of prospective tenants, reviewing the sustainability policies of competitors and realizing the cost-benefit analysis of possible sustainability upgrades.[522] In this way, property investors are able to determine future market standards in terms of sustainability (in terms of tenant expectations and the sustainability level of the future supply) and assess the costs for meeting certain standards. A sound understanding of the relevant environmental legislation and building sustainability certification systems (LEED, BREEAM and DGNB) is frequently regarded as a fundamental prerequisite for conducting this analysis.[523] Second, a company's material

[520] See Interviews; some interviewees cited the introduction of mandatory emissions trading schemes that cover property investors, for example in the U.K., as an indicator of potential legislative initiatives in Germany. Similarly, corporate initiatives and environmental legislation in other industry sectors were frequently mentioned by interviewees as indicators of prospective developments in the real estate sector.

[521] An analysis of the external environment is an essential element of these activities; thus, a sustainability analysis can be performed with limited expenses.

[522] See Interviews.

[523] See Interviews.

sustainability issues can be captured by assessing the sustainability performance of its portfolio.[524] Thereby, the requirements defined in sustainability rating schemes or the sustainability performance of nearby buildings can serve as a benchmark for identifying a company's sustainability concerns with regard to its property stock. The former approach, to a greater extent, takes into account the sustainability demands of stakeholders, particularly prospective tenants, while the latter merely seeks to capture the sustainability characteristics and performance of a company's portfolio.[525] Third, property companies can precisely evaluate the sustainability concerns of their stakeholders in order to uncover the issues that, in the future, may have an impact on their business operations. A stakeholder-engagement process can include organizing sustainability stakeholder forums, examining the expectations of a company's stakeholders via surveys and conducting dedicated meetings with individual tenants and investors.[526] The realization of a bottom-up analysis that flows from observing and identifying substantial sustainability issues on the property level to considering them in terms of the company's sustainability policy ensures that the sustainability policy is properly aligned to its portfolio stock.

Sustainability topics that regularly recur in the interests of various stakeholders or in a multitude of buildings from the portfolio stock can be considered for inclusion in a company's sustainability policy. In this regard, Porter and Kramer (2006) suggested that the sustainability issues affecting a company can be classified into the following three categories:[527]

- generic sustainability issues
- value chain sustainability impacts
- sustainability dimensions of competitive context

Generic sustainability issues are relevant to society but are neither affected by the company's operations nor influence the company's long-term competitiveness. Value chain sustainability impacts, on the other hand, are significantly affected by the company's business

[524] See Interviews; in order to reduce costs and save time, property investors prefer to analyze the sustainability performance of a smaller trial portfolio that is representative of a company's entire portfolio. This in-depth analysis of the sustainability performance of the property stock is regularly conducted with the help of external service providers.

[525] It is worth noting that this analysis often aims to identify potential improvements in the property stock. Companies that have captured their material sustainability issues by assessing the sustainability performance of a trial portfolio and comparing it with the requirements of sustainability rating schemes have drawn on external service providers to conduct the analysis.

[526] See Interviews; see also Stockland (2009a), p. 13; Hammerson (2009), p. 6; Land Securities Group (2009), p. 50; for example, Hammerson examined the SRI policies of its top-21 equity investors by value. This survey revealed that 71% of these investors have a SRI/CSR commitment and/or report on SRI/CSR issues and that 62% have an SRI policy in place. In response to this, Hammerson decided to improve its CSR reporting by adopting the GRI reporting framework.

[527] Cf. Porter, M./Kramer, M. (2006), pp. 85 et seqq.

activities. Sustainability dimensions of competitive context are factors in the external environment that significantly affect the underlying drivers of competitiveness in those spheres wherein the company operates.[528] The ultimate test that should guide the inclusion of individual sustainability issues in a company's sustainability policy is not the test of whether a cause is worthy but whether it provides a chance to create shared value by providing a significant benefit to society and being valuable to the company's businesses.[529] Eventually, these sustainability themes have to be considered within the scope and emphasis of a company's sustainability policy.

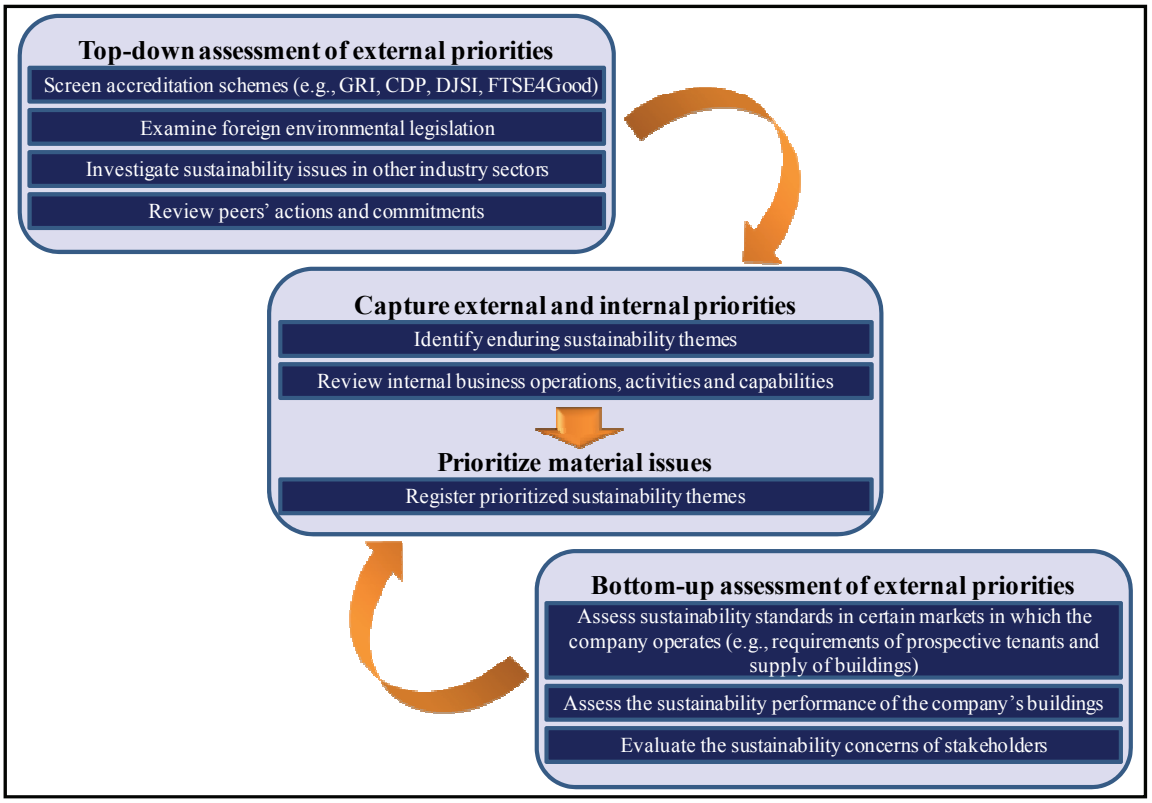
The factors that determine the importance of particular sustainability issues for a company are dynamic and change over time. Accordingly, companies have to regularly perform an assessment of their external and internal priorities that emerge from the sustainability agenda. Finally, the interview findings indicate that the individual German property investors have used varying combinations of the abovementioned tools for developing their sustainability policies. However, they have not outlined a formalized structure to conduct a comprehensive and more strategic corporate sustainability materiality review.[530] The following figure lists the key components of a sustainability materiality review for property investment companies.

[528] Cf. Porter, M./Kramer, M. (2006), pp. 85 et seqq.

[529] Any sustainability issue, in order to be valuable to a company, has to either provide economic benefits or reduce risks that may have financially adverse impacts in the future.

[530] For example, guidelines could outline a standardized process for investigating the sustainability demands of stakeholders and set regular time intervals for reviewing the results of these analyses.

Figure 15: Corporate sustainability materiality review



Source: Own illustration.

5.1.1.2.2 Scope and Emphasis of a Sustainability Policy

The development of a property industry-specific materiality analysis process provides the basis for defining the scope and emphasis of a company's sustainability policy. Property companies are faced with a wide range of sustainability themes. As delineated in the initial analysis in Chapter 4, the most important sustainability issues pertain to the natural environment (climate change/CO_2 emissions, energy use, water consumption, the use of other resources, waste recycling and sustainable materials), stakeholder engagement (tenants, community) and supply chain management. Further sustainability issues such as biodiversity, dangers arising from natural hazards, space efficiency (space/worker), indoor environmental quality and public transportation are accorded much less attention.[531] Likewise, the sustainability efforts of the interviewed German property investors with an explicit sustainability policy generally emphasize the minimization of their impacts on the natural environment. This focus results from the companies' external stakeholders—especially the tenants, investors and government—being particularly interested in the eco-efficiency of buildings. The inclusion of tenants and service providers (e.g., property and facility managers) in the

[531] See Chapter 4.1 and Chapter 4.2; this enumeration comprises the sustainability issues that are discussed in the reviewed U.K. and Australian property companies' CSR reports as well as the sustainability issues that are part of sustainability rating or accreditation schemes.

company's environmental management efforts is seen as a prerequisite to effectively reducing resource use and curbing emissions.[532] The remaining sustainability issues are addressed to a much lesser extent.[533]

In order to achieve their goal of minimizing their impacts on the external environment and thereby to ensure the long-term competitiveness of their building stock, the interviewed property companies implement sustainability management procedures. Their major practices coincide with the sustainability management activities identified in Chapter 4 and particularly include measuring the environmental performance indicators, certifying properties, adapting property development and acquisition procedures, taking measures to identify building inefficiencies and improvement potential, considering sustainability issues in the procurement of goods and services and developing mechanisms to integrate tenants into the company's sustainability efforts.[534] There are several points of reference that can guide a company's sustainability efforts and, accordingly, determine the emphasis of its sustainability policy and activities. First, a company's sustainability policy can seek to improve the eco-efficiency of its property stock—that is, the reduction of energy use, water consumption, waste and CO_2 emissions. This approach particularly builds on measuring the most common operational environmental performance indicators.[535] These data provide the basis for the company's entire sustainability policy, which revolves around the strategic process and activities undertaken to increase the operational environmental performance of buildings. In addition to the measurement of accurate data, the determination of appropriate performance targets (at the building and/or at the portfolio level) and the development of a process to systematically identify opportunities to achieve these targets are critical aspects of such a sustainability policy. For this, the engagement and collaboration with tenants and service providers, in particular property and facility managers, is an essential prerequisite to accurately measure the relevant data and continuously improve the eco-efficiency of the property stock.[536] Second, a company's sustainability policy can center on the realization of a superior, more broadly defined sustainability performance in buildings. This approach generally involves the attainment of a sustainability certification for buildings. All the interviewees agree that the certification of buildings provides economic benefits only in the market for

[532] See Interviews; the interviewed property companies that do not have an explicit sustainability policy in place do not seek to incorporate tenants and service providers into their environmental management procedures; see Chapter 5.1.1.1.
[533] Sustainability issues such as biodiversity, space efficiency (space/worker) and indoor environmental quality are, so far, widely neglected in the sustainability initiatives of the interviewed property companies.
[534] See Interviews.
[535] Further details on the measurement of environmental performance indicators are provided in Chapter 5.2.2.
[536] See Interviews.

high-quality buildings, wherein prospective tenants often demand explicitly certified products.[537] For this reason, many investors hesitate to define the certification of buildings as a broadly pursued strategic focus in their sustainability policy.[538] However, some investors whose property portfolios comprise a high proportion of high-quality premises predict that sustainability certifications, which demonstrate a superior sustainability performance, will become an increasingly important factor influencing the marketability and competitive positioning of buildings in a rapidly growing number of property markets.[539] For this reason, they have begun to establish the sustainability certification of buildings as the central pillar of their sustainability policy.[540] Specific characteristics of such a sustainability policy include defining targets in terms of the percentage of property stock that the investors aim to certify, assessing the opportunities of individual, existing buildings in the property stock to attain sustainability certification and developing procedures that allow investors to easily and systematically identify the opportunities and associated costs to obtain sustainability certification for individual buildings.[541] Thereby, the interviewed investors use a variety of certification labels and do not restrict their approach to the use of one specific system.[542] Eventually, this strategic focus involves considering a broader range of sustainability issues in the company's sustainability policy. Apart from the operational environmental performance of buildings, further relevant aspects include public transportation, indoor environmental quality and the use of sustainable materials.[543]

The present chapter shows that the emphasis of a company's sustainability policy depends on the way in which the company seeks to address the sustainability agenda and improve its portfolio. Eventually, both approaches are not mutually exclusive and can complement each

[537] Large multinational corporations, in particular, tend to prefer sustainability-certified buildings. Ultimately, the sustainability certification of buildings may lead to a more marked differentiation of real estate markets. For further discussion of the potential impacts of the sustainability agenda on real estate markets, see Chapter 5.3.3.

[538] Most property investors only seek to certify properties if it is absolutely required. For example, market standards mandate that newly constructed or refurbished buildings in certain premium locations be certified. For this reason, many investors limit the sustainability certification to this type of buildings; see also Chapter 5.3.

[539] These investors suppose that sustainability certification will rapidly spread to a large number of property markets. The sustainability certification of buildings is seen to create a unique selling proposition that allows investors to reduce void periods and tenant incentives while obtaining the highest market rents.

[540] However, the sustainability activities of these investors are often limited to only obtaining the sustainability certification of buildings.

[541] See Interviews; investors that actively pursue sustainability certification have developed tools (called "Sustainability Quick Checks") that allow them to quickly determine, through a standardized process, the opportunities and costs involved in certifying an individual building.

[542] The decision of which system is to be used for the certification process depends on the individual characteristics of the building. The most frequently cited systems are LEED, BREEAM, EU Green Building and DGNB.

[543] See Interviews.

other.[544] Despite this, the interview findings show that the German property investors that adopt a formal sustainability approach clearly advocate the implementation of a sustainability policy on the basis of actual operational performance data.[545] This approach facilitates the consideration of sustainability across an investor's entire portfolio. Property companies that base their sustainability policy on building sustainability certification schemes risk limiting their efforts to individual buildings, while neglecting the comprehensive consideration of sustainability issues in the remaining property stock.

5.1.1.2.3 Sustainability Goals

The effective and serious translation of a company's sustainability policy into action requires the definition of a set of firm sustainability goals. In general, goals must be measureable, challenging, realistic, consistent and prioritized. Long-term targets refer to the market position or status that a company wants to achieve. They are essential to the success of any strategy or policy because they provide direction and allow the meaningful coordination of a company's activities. Meanwhile, annual targets act as milestones on the way to ensure that certain long-term objectives remain achievable. They relate mostly to the implementation of a policy in a company's business operations.[546] A set of annual and long-term sustainability targets to improve a company's environmental performance has to consist of both performance-based and management-oriented goals.[547]

Management-oriented goals refer to the improvement of a company's sustainability management approach. They include procedures and practices that a company seeks to develop and adopt in its work streams. Management goals concerning the sustainability agenda in property portfolio management can involve advancements in the measurement and control of environmental performance indicators as well as the development and use of green leases, environmental guidance toolkits for tenants, sustainability guides for property acquisitions, waste management guidelines, sustainability development and refurbishment schemes and sustainable procurement policies.[548] German property investors with an explicit sustainability policy particularly endorse and plan measures for improving the measurement and control of environmental performance data, the alignment of sustainability interests between

[544] See Interviews.
[545] See Interviews.
[546] Cf. Saloner, G., et al. (2001), p. 20; David, F. R. (1995), p. 10.
[547] See Chapter 4.1.3 and Appendixes 13 to 17.
[548] See Chapter 4.

tenants and landlords, the consideration of sustainability in property acquisitions and the integration of sustainability in the procurement of goods and services.[549]

Long-term performance-based goals define the level of quality, in terms of sustainability, that a property company targets to achieve in its property stock. First, a comprehensive set of performance-based goals can comprise concrete performance targets for the most important operational environmental performance indicators (energy use, CO_2 emissions, water consumption and waste recycling) at the building and/or the portfolio level. At this juncture, performance-based targets can be defined in either absolute or relative terms. The reviewed Australian property companies tend to define the absolute performance targets that they seek to achieve, whereas the reviewed U.K. property firms set relative performance goals in the form of percentage-based reduction targets that they strive to realize across their portfolios.[550] It is worth noting that all of the reviewed Australian and U.K. property companies have set performance targets for all of the abovementioned operational environmental performance indicators at the portfolio level.[551] Likewise, the vast majority of the interviewed German property investors with a formal sustainability approach have either already set performance-based targets for all the operational environmental performance indicators at the portfolio level or plan to do so in the near future.[552] For this, the interviewees advocate the definition of percentage-based reduction targets. Since the requirements and circumstances of individual buildings (e.g., age, location and occupants) differ largely, neither the Australian and U.K. property companies nor the German investors endorse the setting of firm portfolio-wide minimum standards that have to be achieved by each building in the portfolio

[549] Further details on the individual activities are provided in the following chapters. For investors that cited improving the measurement of environmental data as an important goal, see Interviews; for investors that cited integrating sustainability issues into the tenant-landlord relationship as a relevant goal, see Interviews; all investors that proactively address the sustainability agenda have introduced additional sustainability considerations in their acquisition process. For investors that cited the consideration of sustainability in the company's agreements with service providers as a goal, see Interviews.

[550] It should be noted that percentage-based reduction targets do not allow the assessment of the environmental performance of a property portfolio or the strictness of a company's sustainability approach because they do not consider the overall absolute environmental performance of a portfolio. However, certain reductions in energy use can be achieved easier in a portfolio consisting of energy-inefficient buildings than in a portfolio consisting of energy-efficient buildings.

[551] See Chapter 4.1.3 and Appendixes 13-17; Australian property companies use the NABERS standard to define the absolute performance levels that they aim to achieve. NABERS is a performance-based rating system for existing buildings that rates a building on the basis of its measured impact on the environment. There are individual NABERS ratings for energy, water, waste and indoor environment. NABERS is managed by the Australian government.

[552] For German investors that already have performance-based goals in place, see Interviews; for German investors that plan to define some performance-based goals in the future, see Interviews; investors that plan to set performance-based goals are currently working on establishing a comprehensive data basis. This is a prerequisite for setting targets at the portfolio level.

(e.g., maximum CO_2 emission per m²).[553] Second, performance-based goals can be defined based on the future, targeted proportion of certified buildings in an investor's portfolio stock.[554] However, the majority of the interviewed investors maintained that the sustainability certification of buildings provides economic benefits only in the market for high-quality buildings. Consequently, they chose not to define goals in terms of the sustainability certification of buildings across portfolios.

Both performance-based and management-oriented goals are important for realizing a process that supports the continuous improvement of a company's sustainability performance. In general, a company's sustainability goals are linked to the sophistication of its existing sustainability management capabilities. Companies that have already implemented a broad range of sustainability measures tend to emphasize the definition of performance-based targets.[555] In addition, the interview results reveal that companies without a formal sustainability approach do not have goals at the portfolio level in terms of the sustainability (environmental) performance of their property stock.[556] Their implicit consideration of some sustainability issues (e.g., energy use) within their ordinary asset and property management procedures is restricted to a property-by-property analysis and usually does not include firm improvement goals.[557]

5.1.1.2.4 Sustainability Policy Statement

The formal documentation of a company's sustainability policy in the form of a publicly disclosed mission statement can support the successful implementation of a sustainability policy.[558] A policy statement underpins a company's commitment to the sustainability agenda and highlights the importance of sustainability for the company to internal and external stakeholders alike.[559] In particular, a sustainability statement can help strengthen the incorporation of sustainability mechanisms into day-to-day work streams by raising awareness and signaling employees that sustainability issues receive considerable attention.[560] Further

[553] The specific circumstances of individual buildings entail that the sustainability level that each building should ideally achieve has to be determined individually for each building.
[554] A few interviewed investors set concrete goals regarding the proportion of certified buildings that they aim to achieve in their property portfolio.
[555] Cf. British Land (2009a); Investa Property Group (2009d).
[556] See Interviews.
[557] See Chapter 5.1.1.1; this finding underpins the hypothesis defined in Chapter 5.1.1.1 that an explicit sustainability policy leads to a more detailed management of certain issues, e.g., energy use, water consumption and CO_2 emissions.
[558] See Chapter 4.1 and Chapter 4.2.
[559] Cf. Wood, D. (2009a), p. 7.
[560] The interviewees admitted that a lack of awareness within the corporation and among employees has slowed down or hampered the implementation and application of sustainability mechanisms; see Interviews.

benefits that arise from the clear articulation of a company's sustainability policy are an enhanced clarity and coordination within the organization. These aspects are particularly important because the realization of a holistic sustainability policy requires the inclusion of each functional department of a property company. For this reason, it is common for property companies with a formal sustainability approach to issue some kind of (internal) policy statement.[561] A meaningful sustainability policy statement must outline the scope and content of a company's sustainability strategy, measures taken to address the most important sustainability issues and the specific goals.[562]

In summary, Chapter 5.1.1.2 explained how the definition of a sustainability policy represents a key first step in the realization of a sustainability management approach. However, sometimes the strategy purportedly adopted by a firm is in conflict with the firm's actual operations. If the strategy is not to be merely wishful thinking, it is essential to put into place procedures that will align a company's business operations with its strategy. Accordingly, the following chapters outline mechanisms for considering the sustainability agenda in a company's property investment and management work streams.

5.1.2 Organizational Structures for Sustainability Policy Execution

5.1.2.1 Organizational Structures and Human Resources

In order to successfully execute a sustainability policy, companies need to establish organizational capabilities and resources and to coordinate procedures, employees and responsibilities so as to perform policy-critical activities in a structured and competent manner. These measures particularly include setting up internal governance structures for sustainability, creating specific departments, employing dedicated employees, assigning sustainability tasks to appropriate personnel and customizing compensation schemes.[563] In this manner, companies ensure the proper integration of environmental management procedures into their day-to-day work streams and support the continual improvement of their sustainability approaches.[564] Kok et al. (2010), in their research on the environmental management practices of a large number of property investment vehicles, found that in Europe, more than 62% of

[561] See Interviews; see also Chapter 4.1.3.
[562] Cf. Saloner, G., et al. (2001), pp. 30–32; see also Chapter 4.1 and Chapter 4.2.
[563] See Chapter 4.1 and Chapter 4.2; see also Ireland, D. R., et al. (2009), pp. 308 et seqq.; Haberberg, A./Rieple, A. (2008), pp. 321 et seqq.; Thompson, A. A., et al. (2007), pp. 388 et seqq.; Saloner, G., et al. (2001), pp. 65 et seqq.
[564] Cf. Wood, D. (2009a), pp. 8–9.

the listed property companies and 29% of the unlisted ones employed at least one dedicated employee for managing the company's sustainability activities.[565]

With regard to the organization of tasks, responsibilities and employees, the surveyed U.K. and Australian property companies consistently employ a dedicated sustainability officer and instituted sustainability working groups, which consist of both dedicated sustainability managers and employees of different functional departments.[566] By establishing a centralized corporate division and, at the same time, forming cross-functional sustainability working groups, the surveyed companies aim to reap the benefits of having two different organizational forms. A specialized, dedicated staff is better able to build up expertise, keep track of the rapid changes in sustainability practices, champion the integration of new ideas into company operations and coordinate initiatives across different departments. The participation of employees from different departments in a cross-functional sustainability working group ensures that sustainability is not marginalized within a single department and enables the use of knowledge from a greater number of people with a variety of different experiences and expertise.[567] The interviewed German property companies, on the other hand, have a less homogenous organizational framework for the implementation of sustainability management activities. In most of these companies, the initial sustainability activities were instituted by an employee or group of employees with a specific interest in the sustainability agenda.[568] Accordingly, active and personal engagement from internal advocates represents an important feature at the beginning of a company's sustainability efforts. At this stage, the responsibility for conducting sustainability activities and advancing the company's sustainability agenda is often limited to one specific department.[569] Since the implementation of a holistic sustainability policy covers a variety of different processes pertaining to property investment and management, some German property companies have begun to formalize and better coordinate their sustainability activities. Similar to the U.K. and Australian firms, these companies are following the most popular approach of establishing sustainability working groups. At this juncture, the range of procedures comprise forming a sustainability

[565] Cf. Kok, N., et al. (2010), pp. 45–46; in the U.S.A., 52% of the listed and 43% of the unlisted property companies employ an environmental officer, while in Australia, these percentages are 100% and 80%, respectively.
[566] See Chapter 4.1.3; see also Appendixes 13 to 17.
[567] Cf. Wood, D. (2009a), pp. 8–9.
[568] See Interviews; for example, this is reflected in the fact that employees from very different functional departments are given the responsibility of advancing the company's sustainability policy.
[569] See Interviews; in these companies, individual employees actively promote the company's sustainability agenda. Since the green building initiative is closely related to the technical aspects and improvements of buildings, the (technical) asset management teams are often put in charge of a company's sustainability initiative in the beginning.

group responsible for the advancement of the overall sustainability policy and creating sub-working groups responsible for the realization of specific sustainability projects (e.g., the development of a green lease framework).[570] To further enhance the coordination of their sustainability activities, a few of the interviewed property investors have decided to appoint a sustainability officer.[571] However, the key prerequisite to successfully implement a sustainability policy appears to be the involvement of as many employees as possible in a company's sustainability approach.[572] In addition, irrespective of the company's organizational approach to translate its sustainability policy into actions, public endorsement from senior executives is fundamental for the success of the company's efforts. Since it represents a new type of corporate policy involving a controversial field of action, employees might be skeptical of a company's sustainability initiative and regard it as an extra burden on an already busy schedule.[573] For this reason, the responsibility for overseeing the company's sustainability activities must rest at the level of the board committee or similar such executive body.[574]

Since sustainability constitutes a fairly new aspect in the property industry and the majority of employees are both unfamiliar with and potentially skeptical of the sustainability agenda, companies need to develop procedures to familiarize their employees with the latest sustainability trends, educate and train their employees accordingly and provide examples of best-practice sustainability management.[575] In this regard, a company's activities involve engaging in industry organizations, encouraging employees to develop sustainability expertise (e.g., through the acquisition of the LEED or DGNB auditor's license) and conducting sustainability workshops for employees.[576]

Another way for companies to further induce employees to embrace sustainability procedures in their day-to-day management routines is to link remuneration to the attainment of sustainability goals.[577] The current incentive structures are often based on annual financial

[570] See Interviews.
[571] See Interviews.
[572] See Interviews; a holistic sustainability agenda particularly affects a wide range of activities in property investment and management. Consequently, a sustainability policy to be effective requires a broad range of employees to adopt sustainability management procedures in their day-to-day work streams.
[573] See Interviews; see also Wood, D. (2009a), pp. 6–7.
[574] See Chapter 4.1; CSR ratings, for example, the FTSE4Good and the CDP, require the company board to assume responsibility for the company's sustainability agenda.
[575] See Interviews; similarly, companies that have not implemented a comprehensive sustainability approach regard familiarizing their employees with current sustainability thinking as a key prerequisite.
[576] See Interviews; see also Chapter 4.1 and Chapter 4.2.
[577] See Chapter 4.1 and Chapter 4.2.

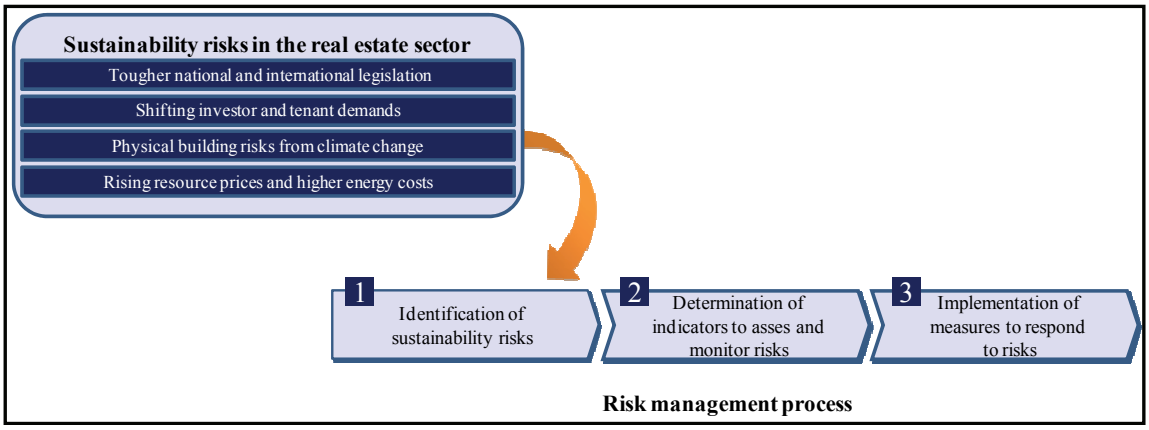
performance figures. Consequently, they undermine energy-efficiency performance improvements that create value in the long-run. In this regard, Kok et al. (2010) revealed that only 20% of the listed and only 3% of the unlisted European property companies have developed incentive structures that take into account the environmental performance of the portfolio stock.[578] In line with this disclosure, the interview findings indicate that it is rather uncommon for companies to link bonuses with the environmental performance of the property stock. In fact, the opinions of interviewees differ widely in this matter, with only a few of the opinion that incentivizing employees, particularly asset managers, is a prerequisite for the successful implementation of a sustainability policy.[579]

5.1.2.2 Sustainability Issues in Property Portfolio Risk Management

Risk management constitutes an essential part of property portfolio management.[580] Since sustainability issues—particularly climate change issues—can present significant risks to the future success and business operations of property companies, increasing attention has to be given to the sustainability agenda in a company's risk management processes.[581] The increased importance of sustainability in risk management reflects in, for example, the CSR documentations of the surveyed U.K. and Australian property companies as well as the reviewed sustainability accreditation schemes that regularly establish the link between sustainability and risk.[582] There are a multitude of sustainability risks in the real estate sector, with the most important ones being rising resource prices and higher energy costs, tougher national and international environmental legislation, shifting investor and tenant demands and physical building risks from climate change.[583] Considering sustainability risks in a company's risk management processes requires developing procedures for the identification of the sustainability issues that might adversely affect a company, determining the appropriate indicators to assess and monitor risks and implementing measures to respond to these risks (see Figure 16).

[578] Cf. Kok, N., et al. (2010), pp. 45–46; in the U.S.A., 15% of the listed and private property companies, respectively, have linked their bonus schemes to the company's environmental performance. In Australia, 50% of the listed and 80% of the private property companies have also done so.
[579] See Interviews.
[580] See Chapter 2.2; for further details on risk management in property portfolio management, see Wellner, K. (2003), pp. 19–31.
[581] See Chapter 3.3.3; see also Matten, D. (2007), p. 403.
[582] See Chapter 4; see also British Land (2009a), pp. 4, 23, 34; Hammerson (2009), pp. 1, 44 et seqq.; RiskMetrics Group (2010c); Carbon Disclosure Project (2010b), p. 2.
[583] Cf. Carbon Disclosure Project (2010b), p. 3; Wood, D. (2009a), p. 3.

Figure 16: Sustainability risk management process



Source: Own illustration.

In general, implementing and adhering to a formal corporate sustainability policy can be interpreted as a form of risk management and a tool to mitigate environmental risks.[584] In order for a sustainability policy to effectively contribute to risk mitigation, sustainability risk management must review the proper execution of a company's sustainability policy and ensure that the policy advances while keeping track of newly emerging sustainability issues. For this purpose, property companies are required to establish internal reporting procedures (e.g., compile internal progress reports) to ensure that their application of sustainability guidelines is reviewed, the progress of the implementation of sustainability management practices is tracked and the variations in the actual operational environmental performance data are analyzed. In addition, an internal reporting framework has to involve regular meetings of the employees who are responsible for formulating the sustainability policy and translating it into action. The results of the aforementioned progress reports must provide those employees with the appropriate information to control and refine a company's sustainability policy so that it addresses the key future sustainability issues. This task particularly includes the definition of new, future goals that provide the basis for the continuous improvement of a company's sustainability performance. The surveyed U.K. and Australian property companies have established extensive formal internal sustainability review processes based on clear rules (e.g., a fixed frequency of meetings of sustainability working groups and a firm structure for the annual assessments of the actual performance against targets), while most of their German counterparts have not yet developed such detailed internal review frameworks.[585] In fact, the German companies often incompletely define the annual targets for individual aspects of their sustainability approaches. This lack of directional milestones occasionally leads to a less rigorous or less frequent assessment of the pro-

[584] See Interviews; See also TMW Immobilien Weltfonds (April 2010), p. 8; Hammerson (2009), p. 69.
[585] See Chapter 4.1.3 and Appendixes 13 to 17.

gress of their sustainability activities.[586] Overall, a company's internal sustainability review procedures ensure the proper implementation and continuous improvement of its sustainability approach and thus contribute to risk mitigation. At this juncture, regular participation in externally managed CSR ratings and accreditation schemes (e.g., the DJSI, FTSE4Good and CDP) can further strengthen a company's sustainability review initiatives. These schemes provide regular and objective assessments of a company's sustainability efforts. Moreover, these tools support the continuous improvement of a company's sustainability agenda because they regularly tighten the requirements in their assessment criteria.[587]

Within a company's risk management procedures, the identification of risks constitutes a key step. Among the manifold sustainability risks, the increasing stringency of environmental legislation in the future is widely seen as the most meaningful threat.[588] Likewise, the surveyed U.K., Australian and German property companies ascribe considerable attention to the current and prospective environmental legislation.[589] At this juncture, investor concerns differ due to the varying legislation in different countries. German investors particularly emphasize the burdens and challenges posed by the ever-tightening mandatory energy-efficiency standards for refurbishments and new constructions.[590] On the contrary, the surveyed U.K. and Australian companies highlight the potential impacts and risks arising from the introduction of emissions trading schemes.[591] Nearly half of all the U.K. firms from the diversified financial, insurance and real estate industries that participate in the CDP cite the introduction of the Carbon Reduction Commitment (CRC) in April 2010 as a serious risk.[592] Accordingly, keeping track of prospective regulation is critical to the effective management of long-term regulatory risks. In this regard, the acquisition of knowledge on the environmental legislation introduced in other countries or industry sectors might represent one opportunity for companies to anticipate future legislative initiatives.[593] Further sustainability

[586] See interviews; German investors with an explicit sustainability approach set long-term goals that outline the direction of their sustainability efforts. Similarly, the establishment of sustainability working groups involves regular meetings. However, there is often an incomplete definition of short-term annual targets that act as milestones on the way.
[587] Cf. British Land (2009a), p. 7; Hammerson (2009), p. 3; Land Securities Group (2009), p. 7.
[588] Cf. Carbon Disclosure Project/Bundesverband Investment und Asset Management (2008), p. 13.
[589] See Interviews; see also Hammerson (2009), pp. 44 et seqq.; Stockland (2009a), p. 8; Land Securities Group (2009), p. 28.
[590] See Interviews; see also Chapter 3.2.1.
[591] Cf. Hammerson (2009), pp. 44 et seqq.; Stockland (2009a), p. 8; see also Chapter 3.2.1.
[592] Cf. Carbon Disclosure Project (2009b), p. 90.
[593] For example, some interviewees cited the introduction of emissions trading schemes in other countries and industry sectors as an indication of the potential regulatory initiatives of the future and as a factor that strengthened their decision to adopt sustainability management procedures; see Interviews.

risks in the real estate sector emerge from shifting tenant and investor demands.[594] To avoid ending up on the wrong side of a two-tiered property market, property companies must capture the sustainability needs and requirements of current as well as prospective tenants and investors. This analysis has to consist of a top-down (e.g., the evaluation of market reports and sustainability rating schemes) and a bottom-up (e.g., the realization of stakeholder forums, meetings with tenants and investors or sustainability surveys) evaluation of tenant and investor preferences.[595] Since the tenants' requirements in terms of the sustainability performance of buildings vary widely, it is impossible for property companies to respond with a standard procedure. Investors regularly tend to certify high-class buildings in order to meet the long-term tenant demand in this market sector.[596] With regard to investor needs, the external reporting of a property company's sustainability approach is widely seen as the most appropriate measure to mitigate such risks.[597] The physical sustainability risks in the real estate sector include climatic phenomena such as heat waves or colder days that lead to increased demands for cooling or heating, eventually resulting in increased wear and tear and higher energy consumption. In addition, natural disasters such as increased flooding or greater flood intensity might bear risks for property investors.[598] Undoubtedly, it is commonplace for the real estate market players to consider these risks during the acquisition process and ensure sufficient insurances to cover them. However, only few property companies have adopted a strategic approach to analyze the physical sustainability risks across the entire portfolio stock. In this regard, sustainability risk management can include the development of tools to capture and raise awareness regarding these risks. For example, Pramerica began to improve its risk assessment for natural disasters by mapping its property stock and the potential natural hazards in the areas surrounding its properties.[599] In general, the significance of physical risks for property investors is closely connected to their regional investment focus. Since Australia is substantially affected by climate change and natural

[594] See Chapter 3.2.3, Chapter 3.2.4 and Chapter 3.3.3.

[595] An analysis of stakeholder needs is a key step in the determination of a company's material sustainability issues. For further details on this analysis, see Chapter 5.1.1.2.1; see also Interviews; see also {Hammerson 2009 #284:10, 40}{Land Securities Group 2009 #373:50}.

[596] See Chapter 5.1.1.1; the fact that the tenants of medium-quality buildings obviously show only limited interest in the sustainability agenda may imply that the owners of such buildings are less prone to the risk of changing tenant demand; see also Chapter 5.3.3.

[597] Cf. Matten, D. (2007), pp. 403–405; Roberts, C., et al. (2007), p. 389; see Chapter 3.2.4 and Chapter 5.5; for example, Hammerson studied the SRI policies of its top-21 equity investors by value. This survey revealed that while 71% of these investors have a SRI/CSR commitment and/or report on SRI/CSR issues, 62% have an SRI policy in place. Hammerson began to apply the GRI guidelines for sustainability disclosure based on the findings of this study.

[598] Cf. Carbon Disclosure Project (2010b), p. 3; Carbon Disclosure Project (2009b), p. 90; Szyman, A./McNamara, P. (2008), p. 6.

[599] Cf. TMW Immobilien Weltfonds (April 2010), p. 8.

disasters, Australian property investors address the physical sustainability risks of their portfolio to a greater extent than German and U.K. property companies.[600]

With regard to the mitigation of environmental risks, EMS implementation is seen as an effective approach to improve a company's risk management.[601] The purpose of an EMS is to provide a company's management with a structured process for assessing, managing and improving its environmental performance. The realization of an EMS is a complex and laborious process that incurs considerable expenditures in terms of cost and time. For this reason, a gradual approach seems to be best suited for its introduction. For example, companies can start by implementing an EMS that, in the beginning, covers the company's development projects, selected properties or certain property types (e.g., retail properties).[602] The certification of a company's EMS eventually ensures that it is properly implemented and addresses the company's key environmental concerns.[603] Without a well-functioning EMS, efforts to improve the environmental performance of a real estate portfolio often remain fragmented and badly coordinated. Initial research on the prevalence of EMSs in the real estate industry, conducted by Kok et al. (2010), showed that 37% of the listed and 17% of the unlisted European property companies had an EMS in place.[604] The surveyed U.K. and Australian property companies recognize the benefits of rigorous EMS implementation by making substantial efforts to improve their tools and targeting ISO 14001 certification.[605] The interview findings suggest that German property investors do not broadly pursue the introduction of an ISO 14001-certified EMS.

5.2 Sustainability Performance Measurement and Assessment

5.2.1 Role and Process of Sustainability Performance Measurement

The measuring, monitoring and benchmarking of the (environmental) sustainability performance of an investor's property stock at both the portfolio and the building level represent

[600] Cf. Stockland (2008); none of the interviewees indicated that natural hazards play a major role in their sustainability agenda.
[601] See Chapter 3.3.3, Chapter 4.1.3 and Chapter 4.1.4.
[602] Cf. British Land (2009a), pp. 6, 30; Hammerson (2009), p. 69; Land Securities Group (2009), p. 21; see also Chapter 4.1.3; for example, Hammerson began to evaluate the impact of ISO 14001 certification in selected assets with a view to implementing a more structured environmental risk management program. British Land has implemented an ISO 14001-certified EMS that initially covers its developments.
[603] Cf. Möller, J. (2007), pp. 188–190; ISO 14001-certified EMS are the most popular systems; see also Chapter 4.1.4.
[604] Cf. Kok, N., et al. (2010), pp. 41–42; in the U.S.A., 5 % of the listed and 8% of the private property companies have implemented an EMS, while these percentages for Australia are 62% and 60%, respectively. These results, however, should be interpreted with caution because of the low response rates.
[605] Cf. British Land (2009a), pp. 6, 30; Hammerson (2009), p. 69; Land Securities Group (2009), p. 21.

key prerequisites for an effective sustainability management approach. Above all, they provide the basis for the following sustainability management activities:

- Assessment of an organization's impact on the environment at both an individual building and portfolio level
- Determination of the scope and emphasis of a sustainability policy by identifying what would constitute appropriate action and what would yield the greatest savings
- Definition of realistic sustainability targets
- Comparison of buildings and portfolios between peer groups
- Preparation for new legislation[606]

This enumeration shows that the measurement and benchmarking of environmental performance forms the foundation for any responsive sustainability policy. Likewise, the interviewees affirm that a company requires some sort of evaluation and measurement to set appropriate goals for controlling and improving the sustainability performance of its property stock.[607] Firm performance-based goals, in turn, form the basis for the implementation of measures to optimize energy performance, the meaningful engagement in retro-commissioning and retrofitting and the adoption of appropriate acquisition and disposition procedures. Hence, without accurately measuring the sustainability performance of a property company's building stock, its sustainability policy potentially remains a matter of rhetoric rather than practice. For this reason, a substantial proportion of the sustainability activities of property companies relate to increasing the breadth and accuracy of performance measurement.[608]

A company's sustainability policy and objectives dictate the key issues of environmental performance measurement and monitoring and thus set the frame for collecting the necessary data and information. As shown in Chapter 5.1.1.2.2, the operational eco-efficiency (e.g., energy use, water consumption, CO_2 emissions and waste recycling) of the property stock and/or sustainability certification systems can serve as points of reference that guide a company's sustainability efforts. The former requires the collection of quantitative environmental performance data, whereas the latter involves the evaluation of the sustainability of building design characteristics. It is obvious that the measurement or assessment of the environmental performance of the property stock will differ for both approaches. Therefore, the

[606] Cf. Better Buildings Partnership (2010), pp. 7–8.
[607] See Interviews.
[608] See Interviews; see also British Land (2009a), pp. 7,16; Hammerson (2009), pp. 12, 44; Land Securities Group (2009), p. 53; Stockland (2009a), pp. 48, 53; Investa Property Group (2009a).

specific characteristics of each approach are discussed separately in the following Chapter 5.2.2 and Chapter 5.2.3.

Companies aiming to determine the sustainability performance of their property portfolios eventually need to define a clear measurement framework that outlines the scope of measurement and analysis (e.g., specific buildings or the entire portfolio), most important sustainability indicators and metrics, availability of data, required capacities to collect data and processes to ensure the accuracy of the data.[609] The success of a company's measurement and assessment efforts depends on the collection of a meaningful set of data and information that have to exhibit the following four key characteristics:

- Clarity: All stakeholders should be able to understand the given information
- Comparability: The data collected should allow for measuring the company's relative performance across investments and over time
- Usability: The procurement and analysis of data and information should not require undue strain
- Accuracy: The measurement framework should include steps to test and ensure the reliability and integrity of data[610]

Comprehensively measuring and monitoring the sustainability performance of a property portfolio is a complex process. It requires the involvement of various stakeholders, particularly tenants and external service providers, because tenants are in actual control of the space and investors often outsource the actual management of buildings to external property and facility managers.[611] Therefore, it is advisable to adopt a gradual approach. For example, measurement can comprise only a few performance indicators in the beginning; as companies become more experienced in data collection, the process can be expanded to include further information. This information or data may have a greater degree of granularity or comprise additional building attributes. Alternatively, property companies can start by measuring and analyzing the environmental performance of a small trial portfolio and then, step by step, extend their scope of measurement.[612]

[609] Cf. Better Buildings Partnership (2010), pp. 5-6, 17.
[610] Cf. Pivo, G. (2009), pp. 484–485; Wood, D. (2009b), p. 7.
[611] See Interviews.
[612] Cf. Better Buildings Partnership (2010), pp. 16–18.

5.2.2 Measurement and Monitoring of Operational Environmental Performance Indicators

The measurement of quantitative performance indicators aims at evaluating the operational sustainability performance of buildings in use. It is only by collecting clear and reliable baseline data that property owners can make informed adjustments in their management operations. Without adequate measurement, it is impossible to track changes over time, assess the success or failure of interventions and plan future activities.[613] For example, if property owners cannot directly measure the energy cost savings that accumulate from the use of more efficient building appliances (e.g., lighting or ventilation), then they are more likely to forego installing them.

The most important issues in realizing an operational performance measurement framework pertain to identifying the indicators that need to be measured, determining practices to collect data and developing processes to systematically analyze the measured data. Various tools that provide lists of the relevant operational performance indicators have been developed by different organizations in attempts to establish a widely used environmental performance measurement framework (see Table 17). An informed decision on which tool or indicators to employ for measuring a property company's operational environmental performance has to take various issues into account. First, the reporting standards that a company strives to apply influence the selection of indicators to some extent. For example, if a company tends to adopt the GRI reporting standard in the long run, then it should consider the GRI requirements in the early stages of its measurement framework. Despite this, it is worth noting that companies should measure sets of data that are compatible with the requirements of a broad range of existing tools. In this way, companies can "future-proof" their approach by ensuring that the collected data can be used without transformation if one common metric standard emerges in the future. Second, the availability and accessibility of data influence environmental performance measurement. Critical aspects relate to, for example, whether absolute or normalized performance data should be collected. Both types of indicators have their own advantages, with the need for absolute as well as normalized data to meaningfully measure the operational environmental performance of an investor's property stock. Absolute performance data provide estimates of the overall impact of a portfolio on its environment. However, they neglect to capture the dynamic nature of the real estate mar-

[613] See Interviews; see also Ceres/Investor Network on Climate Risk (2009), p. 16; Szyman, A./McNamara, P. (2008), p. 15.

ket, for example, changes in portfolio size and asset ownership.[614] Normalized data enable the consideration of the dynamic aspects of portfolio composition.[615] At this juncture, measuring the environmental performance relative to floor area (m²) constitutes the most commonly used normalized indicator.[616] Since the occupational density of buildings attracts greater attention in the sustainability agenda, measuring the environmental performance in relation to occupational density is an increasingly discussed and researched approach.[617] The following table provides an overview of the environmental performance indicators constituting the most prevalent measurement frameworks in Europe.

Table 17: Summary of the current sustainability measurement and benchmarking tools

Measurement	IPD	Upstream	BBP	BREEAM	GRI
Frequency	Annual	Annual	Annual	Annual	Annual
Building details					
Area	Net lettable area (m²)	Net lettable area (m²); gross internal area (m²)	Net lettable area (m²)	Gross internal area (m²); net lettable area (m²)	
Air conditioned	Yes/No	Yes/No; extent of HVAC provision	Yes/No; extent of HVAC provision	Yes/No	
Occupancy	Full-time equivalent employees (FTE)	Number of FTE employees; hours of occupancy; total number of visitors/customers	Number of FTE employees; number of workstations; hours of occupancy	Number of FTE employees; hours of occupancy; total number of visitors/customers	
Asset Rating (EPC)		Yes, if available	Yes, if available	Yes, if available	
Number of floors	Floors	Floors	Floors	Floors	
Number of rooms	Rooms				
Refurbishment information	Date of last refurbishment	Date of last refurbishment	Date of last refurbishment	Date of building services renewal	
Energy					
Mains Energy	kWh/annum	kWh/annum	kWh/annum	kWh/annum	GJ/annum
Oil	kWh/annum	kWh/annum	kWh/annum	kWh/annum	GJ/annum
Gas	kWh/annum	kWh/annum	kWh/annum	kWh/annum	GJ/annum
LPG	kWh/annum	kWh/annum	kWh/annum	kWh/annum	GJ/annum
Solid fossil fuel	kWh/annum	kWh/annum	kWh/annum	kWh/annum	GJ/annum
On-site renewable energy generation	kWh/annum	kWh/annum	kWh/annum	kWh/annum	GJ/annum

[614] For example, if the total size of an investor's portfolio reduces, absolute emissions would also decline, even without the implementation of any direct action to curb emissions. By comparing a consistent, like-for-like set of buildings, it is possible to compare absolute data over time. However, the longer the time span being analyzed, the greater is the number of properties that may need to be excluded; see Better Buildings Partnership (2010), pp. 11 et seqq.

[615] Cf. Better Buildings Partnership (2010), pp. 11 et seqq.

[616] Floor area (m²) is usually readily available because it has to be recorded for other property management purposes such as rents and insurance.

[617] Cf. UNEP Sustainable Buildings & Construction Initiative (2010), p. 9; Better Buildings Partnership (2010), pp. 11 et seqq.; normalizing relative to occupational density is a very complex process and requires considerable efforts by companies. Relevant issues relate to how occupancy can be defined and measured, data collection and how to take into account the different types of activities carried out by the occupants.

District heating	kWh/annum	kWh/annum	kWh/annum	kWh/annum	GJ/annum
District cooling	kWh/annum	kWh/annum	kWh/annum	kWh/annum	GJ/annum
Carbon calculations	DEFRA grid mix standard and fuel emission factors	DEFRA grid mix standard and fuel emission factors; IEA emission factors; GHG protocol	DEFRA grid mix standard and fuel emission factors	DEFRA grid mix standard and fuel emission factors	GHG protocol
Carbon emissions	Metric tons	Metric tons	Metric tons	Metric tons	Metric tons
Optional					
Communal electricity	kWh/annum	kWh/annum	kWh/annum	kWh/annum	
Separable energy uses where separately metered	kWh/annum	kWh/annum	kWh/annum	kWh/annum	
Green energy supply from grid	kWh/annum	kWh/annum	kWh/annum		
Water					
Mains water consumption	m³/annum	m³/annum		m³/annum	m³/annum
Harvested water	m³/annum	m³/annum		m³/annum	m³/annum
Recycled water	m³/annum	m³/annum		m³/annum	m³/annum
Waste					
Total non-recycled waste	Metric ton/annum	Metric ton/annum		Metric ton/annum	Metric ton/annum
Recycled waste	Metric ton/annum	Metric ton/annum		Metric ton/annum	Metric ton/annum

Source: Better Buildings Partnership (2010), p. 25.

The comparison in this table shows that the operational environmental performance indicators measured and analyzed in the different tools coincide widely, with energy use, water consumption, waste recycling and CO_2 emissions representing the most relevant aspects. It is worth noting that the occupational density of buildings is part of each measurement framework, with the notable exception of the GRI framework.[618] This fact indicates that the efficient use of floor space could gain importance in the sustainability agenda in the future.[619] The most significant variations in the measurement results may arise from the use of different methodologies for the calculation of CO_2 emissions. Although the GHG protocol has become the most widely accepted CO_2 emissions accounting and reporting standard in other industry sectors, only the GRI framework prescribes the application of this calculation method to sustainability measurement.[620] In general, collecting the actual CO_2 emissions data pertaining to a property portfolio is a complex task. Aside from the measurement of

[618] This may be due to the fact that the GRI framework represents a reporting framework for a company's overall CSR performance across all three sustainability sections, whereas the remaining tools are designed for reporting the sustainability performance of either entire property portfolios or individual buildings (e.g., they do not consider social aspects such as diversity, bribery and training of employees).

[619] Considering occupational density in the measurement of operational environmental performance indicators may improve the sustainability assessment of office space. However, this concept cannot be transferred to other property types such as retail or industrial buildings.

[620] Cf. Carbon Disclosure Project/Bundesverband Investment und Asset Management (2008), p. 40.

energy consumption, it requires the consideration of the CO_2 intensity of energy sources (indirect/scope 2 GHG emissions) and the inclusion of other indirect GHG emissions, for example, upstream and downstream emissions related to the pre-use phase of buildings (indirect/scope 3 GHG emissions).[621]

Apart from the selection of appropriate environmental performance indicators, property companies must define the scope of their measurement framework. Their analyses can comprise total building data or only consider data pertaining to owner-controlled building parts. Finally, the methods used to collect the data become increasingly important. Environmental performance information can either depend upon estimates from utility bills or be gathered by means of a more advanced metering infrastructure (e.g., automatic meters or "smart" meters).[622] More frequently measured data give property investors the opportunity to employ a more active environmental building management approach.[623]

A growing number of international organizations such as the GRI and CDP aim to promote the collection of more accurate and comprehensive environmental performance data. With regard to the property companies' efforts to capture the operational environmental performance of their property stock, Kok et al. (2010) detected that only few property investors can report their actual figures. The lack of data is reflected in the fact that only 19% of the respondents were able to provide information on energy consumption; 16%, on water consumption; 11%, on waste recycling; and 14%, on carbon emissions.[624] The U.K. and Australian property investors surveyed in the present dissertation measure and report on a broad range of environmental performance indicators. In particular, they provide information pertaining to energy consumption, CO_2 emissions, water use and waste recycling across their portfolio and for individual property types across their portfolio (e.g., energy use in office

[621] Cf. UNEP Sustainable Buildings & Construction Initiative (2010), pp. 12 et seqq.; World Business Council for Sustainable Development/World Resouces Institute (2004), pp. 40 et seqq.; see also Investment Property Databank (2008a), p. 54; for example, the fuel emissions factor will vary from country to country, as well as over time, as the methods of electricity generation determine the fuel emission factor that should be used. For example, France utilizes a high proportion of nuclear fuel (which emits little or no carbon) and currently has a relatively low fuel emission factor for its mains electricity. The U.S.A., in contrast, uses a different fuel mix and currently has a higher fuel emission factor for its mains electricity.

[622] A "smart" meter is a digital meter that records electricity, water or gas consumption with a high frequency and periodically transmits the readings via a dedicated radio frequency or network back to the building manager.

[623] Cf. Better Buildings Partnership (2010), pp. 10 et seqq.

[624] Cf. Kok, N., et al. (2010), pp. 42–43.

buildings across their portfolio), in both absolute and normalized terms. Thereby, individual companies measure data in relation to floor area and occupational density.[625]

Once again, the interview findings show mixed results for the reviewed German property investors. Property companies with an explicit sustainability approach actively work toward implementing a holistic operational environmental performance measurement framework. Similar to the surveyed U.K. and Australian property companies, they seek to measure and analyze energy consumption, CO_2 emissions, water use and waste recycling across their portfolio.[626] It is worth noting that in the German property market, service charges, particularly utility costs, are generally billed on the basis of the actual consumption of energy and water.[627] Accordingly, the main activities of the reviewed German investors seeking to improve their operational performance measurement frameworks involve extending the measurement indicators (particularly the inclusion of CO_2 emissions), instituting consumption-based measurements of utility costs for every tenant in all buildings, installing an advanced metering infrastructure in buildings and implementing improved information systems to facilitate the systematic collection, storage, analysis and benchmarking of the relevant data at both the individual building and the portfolio level.[628] With regard to the latter, the interviewed investors use both publicly available systems (e.g., Energy Star Portfolio Manager Program) and individually customized systems.[629] In contrast, property investors without an explicit sustainability approach have not launched strategic initiatives to improve their operational environmental performance measurement. They usually consider the level of service charges and utility costs on a property-wise basis and do not aim to extend their measurement framework to assess the actual levels of utility consumption (e.g., energy consumption in kWh/annum) and systematically analyze the relevant performance data at the portfolio level.[630] The fact that this group of investors is interested much more in costs than in consumption levels implies that apart from a sharp rise in energy prices, there are no incentives for these investors to improve the eco-efficiency of their property stock.[631] In addition, this

[625] Cf. British Land (2009a), p. 14; British Land (2010a); Hammerson (2009), p. 50; Land Securities Group (2009), p. 54; Investa Property Group (2009c); Stockland (2009a), p. 53.
[626] See Interviews.
[627] Cf. Schultz-Süchting, N./Tegtmeyer, S. (2010), p. 398; however, there are still a few individual buildings in which some utility costs are billed in relation to the rented floor area occupied by the tenants.
[628] See Interviews.
[629] See Interviews.
[630] See Interviews.
[631] Their focus on costs and overlooking of the actual consumption levels—and thus the sustainability performance of buildings—is closely related to the fact that their tenants show very limited interest in the sustainability performance of buildings; see also Chapter 5.1.1.1.

focus on costs entails that they do not plan to measure CO_2 emissions in the near future.[632] Since their measurement frameworks emphasize a property-wise approach, they tend to have less comprehensive tools for collecting, storing, analyzing and benchmarking the relevant data. In summary, an explicit sustainability approach seems to result in a more detailed and comprehensive operational performance measurement framework.

5.2.3 Evaluation of the Sustainability Performance of Property Design

Apart from measuring the operational environmental performance of the property stock, property companies must assess the physical building design attributes that affect the sustainability performance of their buildings. In general, a building's physical design attributes (e.g., location, exterior appearance and mechanical systems) determine its overall quality and ability to compete in future markets. Since the sustainability performance of a building is an increasingly important aspect of building quality and the building's future competitiveness, property companies are required to implement processes for evaluating the sustainability of building design. In addition, such an assessment provides the basis for determining the appropriate upgrade measures that can improve the sustainability performance of individual buildings.[633] Manifold tools are available to assess the sustainability of building design, with the European Union's energy performance certificates (EPCs) and the various green building councils' sustainability certification schemes representing the most important ratings.[634]

In this context, it is worth noting that the regular assessment of the building quality of an investor's property investments has always constituted an essential component of property portfolio management. Such analyses, particularly in the form of regular (annual or semi-annual) asset reviews, provide the basis for property companies' investment planning (planning of future capital expenditures, refurbishments, revitalizations and dispositions).[635] In general, building quality is a matter of perception; it depends on an investor's preferences and the specific circumstances of a building (e.g., location and tenant base). In addition, it changes over time due to changing tenant expectations, increasing building standards of nearby properties and building deterioration. In response to the subjective nature of building quality, the property valuation discipline aims to provide procedures for the objective appraisal of property attributes. The methodologies of property valuation translate the presence and level of building attributes and tenants' willingness to pay for these attributes into

[632] See Interviews.
[633] See Chapter 5.4.
[634] See Chapter 3.2.1 and Chapter 3.2.2.
[635] See Interviews; see also Bone-Winkel, S., et al. (2005), p. 799.

monetary values. For this reason, the property characteristics that are accounted for in property valuation are inevitably decisive factors in property companies' internal assessments of building quality. The property appraisal process covers both locational factors and intrinsic building attributes. The former comprises physical characteristics of land, particularly site size and shape, corner influence, plottage, topography (e.g., danger of force majeure such as flooding), utilities, site improvements, accessibility (e.g., availability of public transportation, proximity to amenities and shopping facilities) and site image. The latter includes an evaluation of the details and condition of a building's exterior (e.g., framing, insulation, ventilation, exterior walls, exterior doors, windows, façade, roof and drainage systems), interior (e.g., interior walls, partitions and doors, and interior supports such as ceilings and flooring systems) and mechanical systems (e.g., plumbing system, HVAC, electrical systems and miscellaneous equipment such as elevators, escalators and fire protection).[636] The overlap of building attributes assessed in property valuation and considered in investors' internal asset reviews is reflected in academic research that identifies column layout and sub-divisibility, space efficiency, HVAC control and capacity, passenger lifts performance and control, floor size, work environment and electrical and IT services as the most significant factors in investors' determination of building quality.[637] With regard to building quality, the influence of building regulations has to be carefully considered. Since the building codes are less strict in the U.S.A. and Australia than in Germany, the German property stock tends to be of higher quality on average.[638]

This excursus indicates that the most important building attributes that eventually determine a building's sustainability performance, based on the most prevalent building sustainability ratings, have been widely common in property investors' assessments of building quality prior to the emergence of the sustainability agenda.[639] For example, a building's energy efficiency is a crucial factor both for its operational environmental performance and for its sustainability rating.[640] It is, in turn, heavily dependent on the building's exterior (e.g., façade, roof and insulation) and mechanical (e.g., HVAC) systems. These building attributes have always been decisive aspects in property investors' assessments of building quality. Likewise, a building's location, particularly its proximity to public transportation and daily

[636] Cf. Appraisal Institute (2001), pp. 195 et seqq., 228 et seqq.
[637] Cf. Ho, D., et al. (2005), pp. 434 et seqq.; Wellner, K. (2003), pp. 195 et seqq.
[638] See Interviews; see also Reed, R., et al. (2009), p. 13.
[639] Several interviewees are of the same opinion. They indicate that many building attributes that are now discussed in relation to the sustainability performance of a building were already part of their building quality assessments prior to the increasing importance of the sustainability agenda; see Interviews.
[640] See Chapter 3.2.1 and Chapter 3.2.2.

amenities, is considered an important aspect of the building's sustainability performance.[641] It has, however, always represented an important feature in property valuation and building quality assessment.[642] Finally, the comprehensiveness of previous asset review procedures alongside the varying importance of the sustainability agenda for individual property investors results in wide differences in property companies' consideration of sustainability in their respective assessments of building quality as well as in their asset reviews.

The introduction of mandatory EPCs requires all property investors to conduct an assessment of the environmental performance of each building every 10 years. Consequently, property companies should now be equipped with the energy-efficiency ratings of their buildings.[643] This legal obligation has increased the importance attributed to the energy-efficiency of buildings in the regular asset reviews of all reviewed investors. Despite this, several investors do not consider it necessary to adapt or extend their previous building quality assessment processes.[644] This group of investors believes that the established review procedures and the realization of EPCs in the portfolio capture all the value-driving building attributes that are relevant in the sustainability arena. In contrast, some property investors, particularly those with an explicit sustainability approach, have begun to implement a formal sustainability section or rating in their regular assessments of building quality. For this purpose, they have developed internal, customized sustainability assessment procedures to capture the sustainability quality of their buildings at regular intervals. These analyses are designed to review the sustainability-relevant building attributes with maintainable efforts across all three sustainability dimensions to provide the investment decision-maker with the necessary information to assess a building's future competitiveness and determine measures to maintain its marketability. These analyses, for instance, include an investigation into whether the external sustainability drivers (particularly tenants and regional markets standards) might require the sustainability certification of the property at hand.[645] Apart from considering sustainability issues in regular asset reviews, some property investors, particularly those that have established the sustainability certification of buildings as the central pillar of their sustainability strategy, conduct an additional discrete sustainability assessment of their property stock.[646] These analyses are often based on the criteria and standards de-

[641] See Chapter 3.2.2.
[642] See Interviews.
[643] See Chapter 3.2.2.
[644] See Interviews.
[645] See Interviews.
[646] See Interviews; see also Stockland (2009a), pp. 50–51; Hammerson (2009), p. 65; Land Securities Group (2009), pp. 28, 44; such analyses were also discussed in Chapter 5.1.1.2.1, as they similarly support the identification of a company's material sustainability issues. It is worth noting that such an additional dis-

fined in sustainability certification schemes. Apart from evaluating the sustainability level of their property stock and identifying appropriate measures to upgrade the sustainability performance of buildings, these examinations particularly aim at detecting individual buildings' opportunities to reach certification level and determining the required measures and associated costs.

The present chapter has described how many building attributes influencing a building's sustainability performance were already included in investors' analyses of building quality prior to the formal inclusion of the sustainability dimension. Despite this fact, several property companies have either introduced formal sustainability sections in their building quality assessment processes associated with their regular asset reviews or conducted an additional discrete sustainability examination of their property stock. In this regard, the interview findings indicate that the explicit consideration of sustainability leads to a more structured, detailed and extended assessment of the influence of sustainability aspects on building quality.[647] Only if companies are able to determine the impacts of the sustainability agenda on their buildings can they make informed decisions in investment planning (planning of future capital expenditures, refurbishments and dispositions) in order to maintain the competiveness of their property stock.

5.3 Sustainability Considerations in the Execution of Investments

5.3.1 Consideration of Sustainability in Property Acquisitions and Dispositions

A property company's investment policy sets the overall frame for its long-term asset allocation and defines the risk-return profile that the company targets to realize in its investments. On this basis, the asset allocation process must translate the strategic objectives of a company's investment policy into clear decision criteria that can guide the property acquisition process.[648] To ensure that the future portfolio composition is in line with a company's sustainability objectives, it is necessary to consider the environmental as well as social aspects in the acquisition due diligence process.[649] In general, the decisions pertaining to property acquisition and disposition are undertaken in a complex environment, with portfolio managers making trade-offs between the property attributes of prospective investments and di-

crete sustainability assessment of the property stock often covers only specific parts of the portfolio. In Australia, the Energy Efficiency Opportunities Act requires Australian property companies to regularly analyze the opportunities to reduce energy consumption and cut emissions in their property stock. This obligation has induced these companies to develop approaches to systematically assess those opportunities.

[647] See Interviews.
[648] See Chapter 2.2.
[649] See Chapter 4.2.

vestments. Accordingly, the inclusion of sustainability issues in investment decision-making is accompanied by the consideration of a multitude of equally important investment criteria.

Chapter 5.2.3 has shown that an in-depth assessment of building quality forms the basis for a property company's investment planning (planning of future capital expenditures, refurbishments, revitalizations and dispositions) in its existing portfolio. Similar to this process, companies assess the building quality and future competitiveness of new investments in their acquisition due diligence. The examination of prospective property investments rests, to a large extent, upon the same building attributes that property companies utilize for the building quality assessment of their existing portfolio stock. In this regard, academic research cites the building's structure, layout and internal configuration, aesthetically pleasing design, age, energy efficiency, roofs, HVAC, facades, insulation and location (e.g., proximity to public transportation, corner effect) as the most important criteria in investors' acquisition rules.[650] Whereas the building attributes that are assessed in property investors' acquisition processes are similar to those considered in the investors' regular asset reviews, the required quality levels differ. The acquisition rules of companies, particularly those of core investors, regularly determine standards that go beyond the levels defined for the existing portfolio. Because property investors commonly have comprehensive property acquisition due diligence procedures in place, the main questions in this chapter relate to whether it is necessary to modify the established investment criteria and how property investors can reasonably consider the increasing importance of sustainability in their acquisition rules.

So far, there has been very little academic research investigating the consideration of sustainability issues in property companies' acquisition processes. Kok et al. (2010) examined the percentage of space added to investors' portfolios (newly acquired or developed) in 2008 that was certified. Their results indicate that Australian property companies outperform all others, with 51% of the new investments of listed companies and 65% of the new investments of private property companies having sustainability certificates. European companies clearly lag behind, with 15% of the new space of listed companies and 10% of the new space of private companies being certified.[651] Another survey, conducted by Union Investment, revealed that 60% of survey participants claimed that sustainability issues were part of

[650] Cf. Jackson, C./Orr, A. (November 2008), p. 4; Trotz, R. (2004), p. 72; Pyhrr, S. A., et al. (1989), pp. 103 et seqq; there is scarcity of academic literature investigating the importance of physical property attributes in property investment decision-making, since most of the research on investment decision-making solely focuses on economic aspects such as regional diversification, selection of markets and tenant quality.

[651] Cf. Kok, N., et al. (2010), p. 44; in the U.S.A., 20% of the new investments of listed companies and 9% of the new investments of private property companies were certified.

their investment process.[652] The previous research, however, has not tackled the main question—that is, what are the ways in which sustainability issues can be considered in property investors' acquisition processes. Schäfer et al. (2008) suggested that property investments should be considered in light of the SRI screening approach, which is applied in the stock market.[653] This would require the definition of firm sustainability performance levels that need to be fulfilled by prospective property investments. Despite the wide differences in the sustainability strategies of the interviewed property investors, none of them advocates the exclusion of prospective property investments merely because a building fails to meet specific predefined sustainability standards.[654] In particular, large investment volumes and the limited supply of sustainable properties entail the investors' rejection of acquisition strategies that aim at exclusively purchasing sustainable or sustainability certified properties. Instead, property companies tend to comprehensively take into account the sustainability level of buildings in their price formation process. However, at this juncture, property investors' considerations of sustainability aspects vary, to some extent. Differences arise from the companies' specific investment focuses (e.g., prime vs. medium-quality premises) and from the individual emphases of their sustainability policies.

Property companies with an explicit sustainability approach tend to formally integrate sets of sustainability assessment criteria into their examinations of prospective investments that transcend those aspects previously covered by their pre-acquisition due diligence processes.[655] The main additional assessment issues comprise the presence or absence of an advanced metering infrastructure (e.g., smart meters) in buildings, the documentation of buildings (which is important for the certification of properties), the materials used in buildings and the ability and flexibility of buildings to meet certification levels and future regulations (ENEV 2009 and 2012) through upgrades.[656] In particular, property companies that expect the sustainability certification of properties to increasingly become a decisive factor for their competiveness—even in property markets that currently do not appreciate sustainability certifications—emphasize the importance of assessing a building's ability to reach specific certification levels and determining the associated costs in the acquisition process.[657]

[652] Cf. Union Investment Real Estate AG (2010).
[653] Cf. Schäfer, H., et al. (2008), p. 222.
[654] See Interviews.
[655] See Interviews; see also British Land (2009b); Stockland (2009a), pp. 21, 60; Investa Property Group (2007b), pp. 2, 5.
[656] See Interviews.
[657] See Interviews.

Investors' sustainability assessment criteria in their acquisition rules are generally closely related to their overall sustainability policies. For example, property companies' consideration of the metering infrastructure in buildings during the acquisition process is associated with their goal of accurately measuring the operational environmental performance of their property portfolios and providing reliable numbers to their stakeholders (e.g., investors, tenants and perhaps regulatory authorities in the future). Similarly, the assessment of the buildings' opportunities to meet sustainability certification levels is related to investors' establishment of sustainability certification as the central pillar of their sustainability policy. In general, many aspects now considered and encapsulated in the sustainability sections of investors' acquisition rules (e.g., energy efficiency and location) were already part of the investment process prior to the introduction of a formal sustainability section. Despite this fact, the interviewees indicate that the formal inclusion of a sustainability section in their acquisition due diligence procedures has led to a more structured, comprehensive and rigorous assessment and consideration of specific issues.[658] The analysis of sustainability inclusion in the acquisition processes of the leading U.K. property companies provides similar findings. For example, British Land, differentiating between investment-critical sustainability issues and potential sustainability value issues, cites, among others, biodiversity (e.g., the designated nature reserves located on the site), land use (contaminated land at or near the site), flood plain (assessment of the chance of flooding), heritage (archaeological or heritage resources on, or within the vicinity of, the site) and materials (asbestos-containing materials in the prospective investment) as sustainability issues that might impede the purchase of a building.[659] Undoubtedly, these aspects already represented decisive investment barriers prior to the increasing momentum of the sustainability agenda. Likewise, many sustainability aspects considered by British Land to decide the pricing of properties, such as energy efficiency of the design and proximity to public transportation and daily amenities, were previously assessed in the property acquisition process. However, these aspects are now scrutinized in a more extensive, structured and detailed manner (i.e., the examination now includes an analysis of the potential for renewable energy technology on site, building management system and sub-metering).[660]

[658] See Interviews.

[659] Cf. British Land (2009b), p. 11; British Land in its "Property Acquisition Sustainability Review" differentiates between investment-critical sustainability issues and potential sustainability value issues. The former can impede the purchase of a building, whereas the latter are taken into account in the pricing of properties.

[660] Cf. British Land (2009b), p. 11; Appendices 16 and 17 provide an overview of all investment-critical sustainability issues and potential sustainability value issues that are considered in the pre-acquisition process of British Land.

In contrast to the aforementioned investors, a few companies have not taken any steps to extend their pre-acquisition due diligence of buildings beyond their previous assessment procedures.[661] It is worth noting that the investment focus of the majority of these investors entails that their purchases mainly comprise second-hand buildings—that is, existing buildings, not newly or recently constructed or refurbished ones. There are a multitude of reasons that induce these investors to forego introducing a separate sustainability section into their acquisition rules. First, existing buildings generally do not feature sustainable building attributes that transcend the scope of the investors' previous assessment procedures. The energy-efficiency aspects and building location, in particular, have always been important elements of their established acquisition processes. Second, this group of investors is of the opinion that considering certain additional sustainability aspects in the property acquisition will not improve the long-term investment results because the tenants in medium-quality buildings are not very interested in the sustainability performance of buildings.[662] Another possibility is that certain individual investors have simply not yet discerned specific sustainable building attributes (e.g., metering infrastructure, building management systems or building documentation) as value drivers that might influence the future pricing and marketability of properties.

With regard to the questions of whether there is any need to modify the established investment criteria and how investors can reasonably consider the increasing importance of sustainability, the present chapter shows how a company's acquisition rules can be adapted in order to account for sustainability. The heightened importance of certain sustainable building attributes (e.g., advanced metering infrastructure and building management systems) in the acquisition processes of a large group of investors might lead to the overall marketplace increasingly recognizing those aspects as value-critical issues. Accordingly, in the future, all property companies may be required to ensure a comprehensive consideration of sustainable building attributes in the acquisition process in order to avoid greater and unplanned maintenance and upgrade measures in the long-run.

5.3.2 Consideration of Sustainability in Property Development

The initial analysis of the CSR reports of the leading U.K. and Australian property companies revealed that considering sustainability in property development projects has, at an early stage, been an important component of the real estate sector's sustainability efforts. This is reflected in, for example, the surveyed U.K. and Australian property companies having

[661] See Interviews.
[662] See Interviews.

policies in place to define minimum performance and certification standards for new property developments and major refurbishments.[663] Likewise, the interview findings indicate that their German counterparts comprehensively consider sustainability issues in new developments and major refurbishments, with the sustainability certification of newly constructed buildings being a common practice irrespective of the company's sustainability approach.[664] Some of the reviewed companies have clearly defined the sustainability certification of new developments and major refurbishments as a goal in their sustainability policy, whereas others have not formally set firm minimum sustainability performance and certification standards.[665] Despite this difference, the overwhelming majority of projects among the most recent property development projects and major refurbishments of the interviewed investors have been certified because either the existing market standards (i.e., peer buildings) or prospective occupants required some kind of sustainability certification.[666] It is only in cases where neither the overall building quality and location nor the prospective tenants justify a sustainability certification that investors do not actively work toward the certification of newly constructed or majorly refurbished buildings.[667]

With regard to the certification label, the interview findings suggest that a common sustainability standard has not yet evolved; the surveyed investors generally utilize the BREEAM, LEED, DGNB and EU Green Building certifications.[668] The application of a specific methodology largely depends on the peculiarities of the individual building (e.g., prospective tenants, refurbishment or new development, certification labels and levels of rival buildings and the certification level that can be attained by the concerned building). At this juncture, it is worth noting that the tenants—the main addressees of building sustainability certifications—are often interested only in whether a building is certified and, if so, its certification level (e.g., LEED Platinum, Gold, Silver, Certified, DGNB Gold, Silver or Bronze). However, they seem to attach little importance to the type of certification label associated with the building (LEED, BREEAM, DGNB or EU Green Building) and its specific characteristics and requirements.[669] In addition, the discussion regarding the sustainability certification of

[663] See Chapter 4.1.3.
[664] See Interviews; the reviewed open-ended property funds do not regularly engage in property development. However, they do regularly undertake major refurbishments of buildings.
[665] See Interviews.
[666] See Interviews; the interviewed investors emphasize that the decision regarding the sustainability certification of a property development or major refurbishment depends on the individual circumstances of a building (e.g., location and tenants). Since the interviewed investors are generally concerned with relatively large buildings in major metropolitan areas, sustainability certification is a common practice.
[667] See Interviews.
[668] See Interviews.
[669] See Interviews.

property developments and major refurbishments has to involve a consideration of the regional building codes that determine the minimum standards for not only newly constructed and refurbished buildings but also sustainability certification systems.[670] The building regulations pertaining to the energy efficiency of buildings are widely observed to be stricter in Germany than in the U.S.A. or the U.K. Since the LEED and BREEAM certifications use the U.S. and U.K. building codes as minimum performance standards, LEED- and BREEAM-certified buildings in Germany do not provide distinct benefits for tenants. In this regard, the majority of the interviewees are of the opinion that all the newly constructed buildings in Germany that meet the mandatory building regulation standards can be LEED-certified. For this reason, they do not expect sustainability certification to generally improve building quality.[671]

There are numerous cost-effective technologies and design strategies that can be used to achieve above-average environmental performances in newly constructed or refurbished buildings. The most frequently discussed measures include the use of on-site renewable energy sources, high-efficiency electric lighting, highly efficient ventilation and cooling appliances, solar water heaters, insulation materials, multiple glazing and effective building control equipment. Apart from the inclusion of such building technologies, an integrated design process involving architects, engineers, contractors and clients is widely regarded as a prerequisite to the construction of an energy-efficient building.[672] In order to keep track of the latest trends in the sustainable building agenda, the reviewed property investors engage heavily in green building councils. In particular, the employees who are in charge of building development or refurbishment in property companies regularly become active members of green building initiatives and often even green building auditors for individual green building labels.[673] Apart from engaging in certain industry organizations, some U.K. and Australian property companies have devised formal toolkits containing examples of best-

[670] See Chapter 3.2.1 and Chapter 3.2.2.

[671] See Interviews; although the investors indicate that the newly constructed buildings in Germany meet certification standards, they also state that the sustainability certification of buildings incurs some extra expenditure. In particular, most of them assume that this expenditure does not contribute to improving the sustainability performance of buildings (e.g., costs relating to the certification process).

[672] Cf. McAllister, I., et al. (2009), pp. 14 et seqq.; Ceres/Investor Network on Climate Risk (2009), pp. 16 et seqq.; Ciochetti, B. A./McGowan, M. D. (February 2009), pp. 33 et seqq.; World Business Council for Sustainable Development (July 2008), pp. 50 et seqq; World Business Council for Sustainable Development (August 2009), p. 6; Levine, M./Ürge-Vorsatz, D. (2007), pp. 393 et seqq.; Ürge-Vorsatz, D., et al. (2007); McAllister, I./Sweett, C. (2007), pp. 12 et seqq.

[673] See Interviews; see also Cf. British Land (2009a), p. 42; Land Securities Group (2009), p. 28; Stockland (2009a), p. 21; Investa Property Group (2010d).

practice information. These guidelines are intended to ensure the implementation of the latest sustainable building trends in the building development and refurbishment process.[674]

5.3.3 Anticipated Effects of Sustainability on Institutional Investors' Portfolios: Theoretical Considerations

The previous chapters of this dissertation have thoroughly analyzed the issues involved in the sustainability policies of property companies. The results of this work provide the basis for a discussion of the anticipated long-term consequences of the increasing impact of sustainability on property portfolios, a subject of importance to participants in the real estate market (investors, tenants and regulators). The interview findings indicate that investors whose primary investment focus is on high-quality premises typically tend to implement an explicit sustainability approach, while most of the investors whose investment focus is on medium-quality buildings have not yet begun to develop a holistic sustainability approach. Apart from environmental regulations, the tenants' interest in the sustainability agenda provides the main impetus for a property company's decision of whether or not to introduce and actively work toward a formal sustainability strategy. Tenants have widely varying requirements and needs in terms of the sustainability of the buildings they occupy. While all tenants are to some extent interested in the level of service charges, some occupants are also interested in the building's CO_2 emissions, while still others may require that their prospective rental space be certified.

Since a building's sustainability characteristics constitute an increasingly important factor in the decision making of tenants, it has become essential to consider the factors that influence tenants' sustainability requirements and expectations. In the market sector for high-quality premises for which tenants are willing to pay the highest rents, tenant expectations are affected by the level of quality of the buildings that have most recently been added to the market. Due to continually tightening mandatory energy-efficiency standards (ENEV) and the steadily rising sustainability standards of the most prevalent building sustainability certification schemes, new buildings (i.e., newly constructed as well as refurbished buildings) added to the market have a better sustainability performance than existing premises. This, in turn, leads to an increase in both the market standards of premium assets and the sustainability expectations of premium tenants.[675] Consequently, core assets whose aim is to attract prime

[674] See chapter 4.1.3; see also British Land (2009c); British Land (2009a), pp. 30-31, 62; British Land (June 2007); Hammerson (2009), pp. 25, 28; Land Securities Group (2009), p. 21; Investa Property Group (2009d); Stockland (2009a), pp. 9, 21, 52.

[675] The rising market standards are reflected, for example, in the sustainability certification of newly constructed buildings representing a core prerequisite for premium buildings; see Chapter 5.3.2.

tenants compete in a market environment in which the sustainability level that is demanded by tenants is heavily influenced by the latest energy-efficiency and sustainability standards, as determined by sustainability certification schemes or environmental regulations. Because these standards, which are externally determined, have been frequently raised in recent years, core properties may, in the future, require more frequent and more substantial investments in order to meet given (environmental) sustainability performance levels and maintain their competiveness.[676] Without regular investment in upgrading to the latest market standards, the market position of premium buildings will deteriorate. As a result, the sustainability agenda may contribute to shortening a premium building's lifecycle. At this juncture, it is a building's inability to meet tenant sustainability requirements rather than the deterioration of its technical systems that renders the building obsolete earlier than was originally expected.[677] Since sustainability is a major component of premium tenants' requirements for a building, the continual raising of sustainability standards can be expected to accelerate this process. In addition, in this market sector, the (short-term) financial benefits of more energy-efficient buildings (whose tenants incur lower utility costs) are further strengthened by the rising number of tenants who voluntarily offset their CO_2 emissions and increasingly consider these costs when calculating their rental budgets. However, new prime buildings, and sustainability-certified energy-efficient buildings in particular, are often equipped with sophisticated and complex technical systems to achieve superior environmental performance. It is commonly supposed that such systems require frequent and intensive maintenance, and thus increase a building's operating costs. Indeed, in real estate practice and academia, increased building efficiency and lower utility costs are often cited as a major advantage of sustainable buildings.[678] However, the substantial impact of increasingly complex technical building systems on operating costs has been completely neglected in previous sustainability considerations.[679]

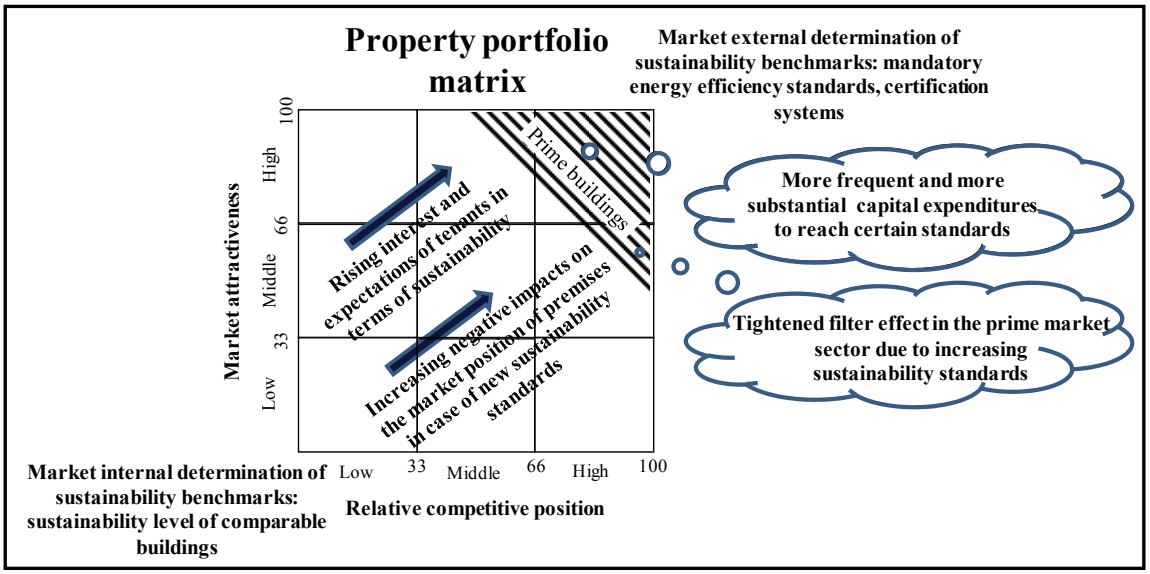
In the market sector for medium-quality buildings, the very limited sustainability concerns of tenants are obviously related to the level of utility costs. In particular, their demands are barely influenced by externally determined sustainability standards (i.e., mandatory energy-efficiency standards and certification systems). Accordingly, the competitive positioning of

[676] This view is also shared by Bone-Winkel (2011); See Bone-Winkel, S. (2011).
[677] Building obsolescence is reflected in tenant move-outs, increasing rates of vacancy and re-letting at lower rent levels.
[678] It is worth noting that only a very limited number of studies have empirically analyzed the utility costs of sustainable or sustainability-certified buildings. In particular, such research has not been conducted for the German real estate market. See Chapter 3.4.2.
[679] To the author's knowledge, no research has been done that empirically investigates the impact of sophisticated and complex technical building systems on a building's maintenance costs.

this type of building is exclusively determined by the market's internal factors—that is, the overall price and quality level of comparable buildings. Hence, it can be surmised that such buildings are less prone to the adverse effects that arise from constantly increasing sustainability standards, and, in particular, are much less affected by new requirements voiced by tenants.

In summary, the continual raising of sustainability standards in newly constructed and significantly refurbished buildings lead to the deterioration of the existing property stock in terms of its market position. Since tenants in the high-quality market sector are the most willing to pay the highest rents, they automatically expect the latest building standards. This is reflected in the fact that the investors who mainly hold prime premises report an increased interest in sustainability on the part of their tenants, and detect an associated change in tenant requirements. In contrast, tenants in the medium-quality market sector want their basic needs to be fulfilled, but are less willing to pay for the latest building standards. This is reflected in the fact that the investors who mainly hold medium-quality buildings discern no tenant interest in the sustainability of buildings. For this reason, it is supposed that the aforementioned deterioration in the market position of existing buildings due to the continually increasing sustainability-quality level of new spaces added to the market affects prime premises in particular, while medium-quality buildings are less prone to this effect. Finally, this situation is expected to be reflected in a tightening filter effect in the premium market sector. Continually increasing standards of sustainability lead to shorter intervals in which prime buildings are able to meet the requirements of prime tenants. As a result, prime buildings suffer from an accelerated economic obsolescence. Beyond this, the observed differences in tenants' sustainability requirements and real estate investors' sustainability strategies (in particular the use of sustainability certification systems) are expected to cause a more marked differentiation of property markets. Figure 17 illustrates this scenario in detail.

Figure 17: Anticipated effects of sustainability on a property portfolio



Source: Own illustration.

Ultimately, the implementation of a comprehensive sustainability policy must be interpreted as a company's approach to alleviating the adverse effects of the market's increasing sustainability standards on the competitive positioning of its property stock. A number of measures can be taken to increase the operational efficiency and overall sustainability performance of buildings. These include detailed measurement and analysis of a comprehensive set of environmental operational performance data (energy use, CO_2 emissions, water use and waste recycling), the definition of clear environmental performance or reduction targets and the sustainability certification of buildings. By adopting such measures in their management work streams, companies can improve the competitive positioning of their buildings in the marketplace. Conversely, premises that are managed by companies with a comprehensive sustainability approach can be expected to outperform those managed by companies that do not address the sustainability agenda.

Thus far, this study's findings have shown that the definition of clear performance targets is a prerequisite for the continuous improvement of the sustainability performance of an investor's existing property stock. To attain these goals, companies need to take appropriate measures to increase the eco-efficiency of their investment properties. The following chapters identify and examine the most prevalent practices.

5.4 Sustainability Issues in Asset and Property Management

5.4.1 Sustainability-oriented Tenant Engagement and Green Leases

5.4.1.1 Informal Sustainability Approaches in Tenant Engagement

In industrialized countries, the greatest potential for improving the environmental performance of the real estate industry lies in the existing property stock.[680] In order to optimize the eco-efficiency of standing investments, property companies must explicitly consider sustainability aspects in their asset and property management operations.[681] Even buildings designed to achieve high environmental performance can be used and operated inefficiently, resulting in below-average environmental operating levels. The operational environmental performance of a building (e.g., energy consumption) is determined by the nature of the asset, the way in which the landlord runs the shared services and the occupants' actions and behavior.[682] In many cases, the occupants, as the main users, have the greatest impact on a building's actual environmental performance. For this reason, tenant engagement—that is, the collaboration between property owners and tenants—constitutes a crucial prerequisite for achieving a superior environmental performance in property portfolios.[683] In this regard, the problem of misplaced incentives represents a major barrier that needs to be overcome. Since the current lease structures entail that the financial benefits of energy efficiency investments accrue either to the landlord or to the tenant, the respective other party has very limited incentives to contribute to energy-efficiency improvements.[684] In addition, the accurate measurement of a building's operational performance (e.g., energy use, water consumption and waste recycling) requires the cooperation of landlords and occupants. It is only with the help of tenants that property companies are able to gather all the relevant data, because it is the tenants who are in actual control of most of the space in a building.[685]

There are various ways in which property investors can motivate a building's occupants to use the building in a sustainable manner and change the non-sustainable habits or behavior of building staff. For example, the reviewed U.K. and Australian firms conduct regular sus-

[680] See Chapter 3.1.1; see also McAllister, I./Sweett, C. (2007), p. 4; Reed, R. G./Wilkinson, S. J. (2005), p. 343.
[681] See Chapter 4.2.
[682] Cf. Better Buildings Partnership (2010), p. 7; Hinnells, M., et al. (2008), pp. 643–644; Ürge-Vorsatz, D., et al. (2007), pp. 380–383.
[683] See Interviews; see also Chapter 4.2; see also UNEP Finance Initiative (November 2009), pp. 5 et seqq.; UNEP Finance Initiative (March 2009), pp. 12–13; Ciochetti, B. A./McGowan, M. D. (February 2009), p. 29.
[684] See Chapter 4.3.3.
[685] See Interviews.

tainability meetings with their occupants.[686] In addition, they provide guidance material in the form of tenant sustainability guides, sustainable fit-out guides, fit-out waste guides, waste management guides and green travel plans to their tenants; they also procure expert advice for environmental auditing.[687] Apart from encouraging their tenants to adopt sustainable building use, these investors may be developing and introducing such tools in order to lay the foundations for the certification of their existing buildings. For example, the BREEAM assessment scheme awards credits for the deployment of "green" travel plans that help reduce user reliance on forms of travel that have the highest environmental impact. Likewise, the fit-out waste guides may be procured because the BREEAM sustainability rating allocates credits for the appropriate sorting and separating of waste generated by fit-out works. Moreover, the BREEAM certification process awards additional credits for the preparation of building user guides. Such guidelines must provide occupants and non-technical building managers with the relevant information required for realizing efficient building operations, including an energy and environmental strategy, water use guidelines, transport facilities, a materials and waste policy, re-fit considerations and reporting provisions.[688] Likewise, the LEED for Existing Building Operations and Maintenance (LEED-EB) scheme encourages the introduction of procedures and policies aimed at minimizing the environmental impacts from tenants' use of buildings. For example, it assigns credits for reductions in conventional commuting trips during the performance period. In addition, the LEED-EB requires the implementation of a solid waste management policy that facilitates the reduction of waste generated by building occupants.[689] In line with this argument, Kennedy Associates, for example, indicated that the increasing number of occupants interested in pursuing LEED Commercial Interior certification has acted as the main impetus for the development of its sustainable tenant improvement guide.[690]

In contrast to the reviewed U.K. and Australian property companies, the vast majority of the interviewed German investors hesitate to conduct dedicated sustainability meetings with their building occupants or to provide them additional sustainability guidance materials such as tenant sustainability guides, sustainable fit-out guides, fit-out waste guides or waste management guides. At present, protocols and guidelines for the handover of office building operations to tenants are commonplace in German investors' business operations. Likewise,

[686] Cf. British Land (2009a), pp. 42, 71; Hammerson (2009), pp. 42, 60.
[687] Cf. British Land (2009a), p. 6; Hammerson (2009), p. 38; Land Securities Group (2009), pp. 22, 43; Stockland (2009a), pp. 17, 35; Stockland (2008), pp. 11, 26; Investa Property Group (2010a).
[688] Cf. Building Research Establishment (2008b), pp. 52-56, 157-159, 212-219.
[689] Cf. U.S. Green Building Council (2010a), pp. 4-7, 42 et seqq.
[690] Cf. UNEP Finance Initiative (November 2009), pp. 21–22.

German investors regularly discuss sustainability issues with tenants at the time of implementing necessary building upgrades.[691] However, it is exceptional for German investors to undertake additional, systematic measures along the lines of the U.K. and Australian firms, with only two of the surveyed investors conducting dedicated sustainability meetings with the tenants or providing specific guidelines to them.[692] At this juncture, the lack of dissemination of sustainability certifications for building management and existing buildings in Germany may constitute one reason for the German investors' reluctance to develop informal sustainability-related tenant-engagement guidelines.[693]

5.4.1.2 Formal Sustainability Approaches in Tenant Engagement

Apart from informal, cooperative tenant-engagement activities such as conducting dedicated meetings with tenants and providing guidelines to them, several property companies have begun to integrate sustainability covenants into their contractual landlord-tenant relationship (called "green leases").[694] Green leases are generally understood as lease contracts that impose sustainability obligations on both tenants and landlords. Despite this common idea of a green lease and the increasing use of the term in real estate practice and academia, there is neither a widely accepted definition nor a common understanding of what exactly constitutes a "green lease".[695] This fact particularly holds true for the German property market.[696] A multitude of academics, industry organizations and corporations, such as the Better Buildings Partnership (2009), Cardiff University (2009), RICS (2009), the California Sustainability Alliance (2009), Hinnells et al. (2008), Hammonds LLP (2008), Investa Property Group (2007) and the Australian government (2006) have developed and provided definitions and conceptualizations of a green lease. The key components that are common to most proposals can be summarized as follows:[697]

- The landlord and occupant agree to collaborate in order to enhance the sustainability performance and reduce the environmental footprint of the building.

[691] See Interviews.
[692] See Interviews.
[693] Sustainability certification systems for existing buildings emphasize building management aspects in the certification process. In Germany, the sustainability certification of buildings has exclusively focused on newly constructed and major refurbished buildings.
[694] Cf. British Land (2009a), p. 42; Hammerson (2009), p. 37; Land Securities Group (2009), p. 22; Investa Property Group (2007a); Stockland (2008), p. 27.
[695] Cf. Hinnells, M., et al. (2008), p. 545.
[696] Cf. Schultz-Süchting, N./Tegtmeyer, S. (2010), p. 397.
[697] Cf. Better Buildings Partnership (2009); Cardiff University/Centre for Research in the Built Environment/British Council for Offices (July 2009); RICS (2009b); California Sustainability Alliance (2009); Hinnells, M., et al. (2008); Investa Property Group (2007a); Australian Government - Department of Climate Change and Energy Efficiency (2006).

- The parties agree to exchange all their respective data pertaining to the environmental performance of the building. The relevant information comprises electricity, gas and other resource use, water consumption and waste generation and recycling.
- The landlord installs separate metering facilities and the installation of smart-metering technology should be considered.
- The parties agree on a minimum sustainability/energy performance rating for the building. The landlord promises to maintain the rating level during tenancy, while the tenant consents to use the building in a way that will allow the maintenance of the certification level. In particular, both parties agree that they will not alter the rented space without examining the impact of those measures on the building's environmental performance and its sustainability certification.
- The parties jointly set up a building management committee, comprised of representatives of the investor, tenants and external property and facility managers, which will hold regular meetings. The committee will review the building's environmental performance; agree on annual targets for the reduction of energy, water, carbon and waste; try to increase the use of renewables and recyclables; and produce an annual statement on the progress toward the targets.
- The parties agree to share with each other information on the hours of occupancy; the lighting, heating and cooling requirements; and the building environmental management system. The landlord commits to minimizing the unnecessary provision of lighting, heating and cooling.
- The landlord agrees not to require the reinstatement of alterations made by the occupant that enhance the environmental performance of the building.
- The parties agree to collaborate to realize the specific, listed measures in relation to waste, water, energy, auditing, alterations, cleaning, transportation, and educational programs.
- The landlord conducts regular environmental performance audits or ratings of the building.
- The parties develop and agree on an energy management plan for the building.
- The parties agree to consider sustainability issues in the sourcing and specification of all fit-out work.
- The parties agree to consider sustainability issues in facility management and cleaning contracts. These contracts must outline appropriate cleaning and maintenance procedures for both owner- and tenant-occupied areas.

Despite these common aspects in green lease proposals, a standard green lease is not expected to emerge in the property sector. The appropriate arrangements that best fit a particular lease agreement depend on the specific circumstances of an individual building (e.g., type and size of a building and the varying levels of knowledge as well as different levels of ambition of the parties to the lease).[698]

The aforementioned green lease proposals were developed taking into account the peculiarities of Anglo-Saxon property market standards and legislation. Since the external circumstances are different in Germany, these green lease proposals cannot be transferred as they are to the German property market. For example, separate metering is quite common in Germany and, thus, in many cases would only represent a cosmetic marketing covenant. Similarly, Schultz-Suechting and Tegtmeyer (2010) opined that individual clauses would not comply with the German General Terms and Conditions Act.[699] In this regard, the interview findings, however, indicate that the interviewed German investors' understanding of a green lease largely conforms to the aforementioned green lease covenants. From their point of view, the main elements that are practicable and achievable in a green lease pertain to agreements regarding data sharing, collaborative measures to improve waste recycling, activities to foster energy and water efficiency in the use and management of buildings and the procurement of "green" or "sustainable" facility management and cleaning services.[700]

To the best of the author's knowledge, there is no study that provides details on the use and dissemination of sustainability covenants in lease contracts in real estate practice. Green leases have particularly gained in importance in Australia because the Australian government dictates the application of green leases for its own rental activities.[701] Property companies widely recognized as leaders in the adoption of green leases are British Land, Hammerson, GPT Group and the Investa Property Group.[702] For example, British Land has signed a "Carbon Reduction Memorandum of Understanding (MoU)" with 30% of its occupants in multi-let office buildings,[703] while Hammerson has signed 700 green leases since

[698] Cf. Cardiff University/Centre for Research in the Built Environment/British Council for Offices (July 2009), pp. 11 et seqq.; Hinnells, M., et al. (2008), pp. 546 et seqq.
[699] Cf. Schultz-Süchting, N./Tegtmeyer, S. (2010), pp. 398–399.
[700] See Interviews.
[701] Cf. Australian Government - Department of Climate Change and Energy Efficiency (2006); there are eight different green lease templates used by the Australian government in its own rental activities.
[702] See Chapter 4.1.3; see also UNEP Finance Initiative (November 2009), pp. 7 et seqq.; Kimmet, P. (2009), p. 475.
[703] Cf. British Land (2010a), p. 3; a carbon reduction memorandum of understanding (MoU) is an agreement between British Land and its occupants that aims to reduce resource use and generate cost savings. British

2007.[704] At this juncture, the detailed green lease arrangement is an important aspect, particularly since agreements in the form of a memorandum of understanding are generally not legally binding. In addition, the green leases used by many Australian and U.K. property companies include obligations for both parties without firm performance targets or any enforceable liability to adopt specific environmental management practices. Many green leases mainly comprise aspirational goals in terms of owner and tenant behavior. Accordingly, the breach or non-achievement of lease targets usually results in neither the imposition of financial penalties nor any other formal legal response. The key value of such green leases is that they raise awareness and educate tenants and landlords.[705]

Although the interviewed German investors have a general idea of the potential content of a green lease, the interview findings show that sustainability covenants have very rarely been adopted in previous lease contracts. Only one investor admitted to have signed green leases, and that too very sporadically, in its investment properties abroad.[706] Furthermore, individual investors have begun to develop a potential structure for green leases only in recent times.[707] In general, however, the interviewed investors hesitate to adopt a systematic green lease approach. Green leases commonly impose additional obligations on both tenants and landlords. The greater the obligation levels in a lease for a tenant, the less attractive is the building likely to be for tenants; hence, the interviewed investors avoid placing too many restrictions and controls on leases.[708] Investors who address the green lease agenda were prompted by their occupants' active demands for a green lease agreement or (prospective) legislation in certain property markets.[709]

Despite the investors' reluctance to introduce sustainability covenants in their lease contracts, they recognize the problem of misplaced incentives as a major barrier impeding the

Land believes that introducing a MoU is a much faster route to propel environmental sustainability than waiting for an existing lease—many of which can take 15 years or longer—to come up for renewal. It should be noted that the MoU is not legally binding. Therefore, it represents a starting point for both tenant and landlord at the more informal end of the spectrum.

[704] Cf. Hammerson (2009), p. 2.

[705] Green leases introduced and used by the Australian government contain stricter and more comprehensive sustainability clauses, for example, firm environmental performance standards. The government's ability to insist on the use of this kind of green lease arises from its strong position in the rental market. Approximately 13% of the Australian commercial office market is occupied by the Australian government.

[706] See Interviews.

[707] See Interviews.

[708] See Interviews.

[709] For example, interviewees cited France's passing of the "Grenelle 2" law as one reason for the development of a green lease framework. This act includes the requirement to append a clause to lease contracts for premises above 2,000 m²; the clause covers certain environmental issues. For further information on Grenelle 2, see CB Richard Ellis (2010), p. 6.

uptake of sustainability measures. In this regard, green leases can present the first step to overcoming this problem because they bind both tenants and landlords to sustainable behavior and actions. Another possible way to resolve the issue of misplaced incentives could be the signing of a gross rental contract in which the occupant will receive the utility cost savings arising from using the building efficiently, whereas the economic benefits resulting from capital expenditures will accrue to the investor.[710] Another approach to address the misplaced incentives problem is the "Greenhouse Guarantee" of the Australian Investa Property Group. In this scheme, the tenant invests in energy-saving technologies, whereas the landlord provides a guaranteed cap on energy bills. If the energy performance is better than expected, the occupants can keep the savings.[711]

Overall, there are a multitude of opportunities for investors to intensify collaboration with their tenants in order to improve the eco-efficiency of their buildings. However, the success of a property company's tenant-engagement activities greatly depends on the level of cooperation and responsiveness of individual tenants. The varying interests of tenants in the sustainability agenda eventually lead to different classes of investors having different attitudes toward sustainability-related tenant-engagement activities. In particular, property companies that have a high proportion of high-end occupants tend to attach greater importance to the tenants' influence on their buildings' environmental performances and to include occupants in their eco-efficiency improvement efforts.[712]

5.4.2 Sustainable Building Management

5.4.2.1 Low-cost Sustainability Approaches in Building Management

In addition to sustainability-oriented tenant-engagement practices, a company's sustainability approach must ensure the inclusion of sustainability considerations in its building management practices.[713] In this dissertation, building management practices are understood as comprising the day-to-day maintenance and operation of buildings as well as the long-term capital expenditure planning of major replacements and building upgrades. The first two types of building management practices require zero or very little capital investments on a regular basis, whereas the latter involves substantial capital investments. The WBCSD (2008), researching the economic benefits of eco-efficiency investments, suggested that, at

[710] Cf. Kok, N., et al. (2010), p. 13.
[711] Cf. Investa Property Group (2010e); see also Chapter 4.1.3 for further information on Investa's "Greenhouse Guarantee".
[712] See Interviews.
[713] See Chapter 4.1 and Chapter 4.2.

the then-current energy prices, it would be possible to realize worldwide energy investments totaling US$ 150 billion across all property types with five-year discounted paybacks for the owner, resulting in a 40% reduction in energy use. Such calculations, however, are subject to various economic assumptions and uncertainties.[714] In addition, energy-efficiency opportunities vary in different countries because of different building standards. Nevertheless, this estimate is indicatory of the magnitude of opportunities available in this field.[715] The following two chapters do not examine individual eco-efficiency improvement measures for buildings in detail because this dissertation's research focus is on evaluating companies' investment-related decision-making processes in this realm.

As described in the previous chapters, the rigorous consideration of sustainability in both low-cost and value-added building management practices requires and builds up on the sustainability reviews performed either as part of investors' regular asset reviews or as stand-alone environmental sustainability reviews, the measurement of operational performance data and the definition of appropriate environmental performance targets. The setting of clear reduction targets is essential for companies working toward the continuous improvement of the sustainability performance of their property stock. In addition, the regular evaluation of the details and conditions of property design attributes and the measurement of operational performance data are fundamental for identifying potential eco-efficiency opportunities and assessing the success of interventions.[716]

Potential activities in the day-to-day maintenance and operation of buildings aimed at achieving eco-efficiency improvements in the property stock include carrying out low-cost, profitable building upgrades to curb resource use and emissions (e.g., low-energy "intelligent" lighting, low-energy bulbs and water-saving devices), implementing energy and waste management policies (e.g., instituting a lights-off policy during periods of no occupancy,

[714] In general, studies that quantify potential energy efficiency improvements in the real estate sector do not clearly explain to what degree they consider the energy and resource use that is required to realize the stated reductions. See, for example, World Business Council for Sustainable Development (August 2009), Stern, N. (2008) and Enkvist, P.-A., et al. (2007).

[715] Cf. World Business Council for Sustainable Development (August 2009), p. 7.

[716] See Chapter 5.1.1.2.3 and Chapter 5.2; the processes of systematically and regularly identifying potential energy efficiency improvements can be either part of investors' regular asset reviews or stand-alone environmental sustainability reviews. Although environmental sustainability aspects (particularly those relating to the operation and performance of the building and its machinery) generally constitute an increasingly important aspect of the regular asset performance reports of property managers and are an essential element of investors' regular asset reviews, several investors carry out an extra, dedicated sustainability audit; see also see Interviews; see also Stockland (2009a), pp. 50–51; Hammerson (2009), p. 65; Land Securities Group (2009), pp. 28, 44.

such as weekends, or establishing waste-recycling schemes), collecting specific energy and waste management performance data and ensuring that the building and its machinery are working at optimum performance levels.[717] Some of those measures have undoubtedly been standard tasks in a company's property management procedures, regardless of the company's ambitions in the sustainability arena, and are now merely discussed under the sustainability umbrella.[718] Likewise, the interviewed investors indicate that company internal asset and property managers commonly use some sort of checklists or guidelines in order to maintain a certain level of quality and to establish, to some extent, uniform procedures. However, these tools are not regularly adapted to specifically consider and improve the environmental performance of buildings. For this reason, individual companies implement explicit building management toolkits to systematically set and extend standards for the environmental management of their property stock and to increase the level of detail of their sustainability considerations in building management. In addition, formal sustainable building operating guidelines ensure that the latest and best environmental management options are adopted across an investor's portfolio and that they are refined at regular intervals.[719]

Property companies can use a multitude of information sources for developing formal sustainable building management procedures. The most sophisticated approach is to conduct dedicated sustainability audits of the company's property stock and environmental management operations and thereby develop sustainable building operating practices. This analysis allows property companies to supplement their previous asset and property management procedures with the most effective and appropriate sustainable building measures for their portfolio. The realization of such a comprehensive approach will often require property companies to bring in third-party expert knowledge.[720] Moreover, property companies can examine the activities described in public domain documents of their rivals and implement

[717] See Interviews; see also TMW Immobilien Weltfonds (April 2010), pp. 16 et seqq., 49; British Land (2010d); British Land (2009a), pp. 17, 22; Hammerson (2009), pp. 10, 12, 29; Land Securities Group (2009), pp. 22, 28; Stockland (2009a), pp. 20, 21, 46, 60; Investa Property Group (2007b), pp. 2,3; UNEP Finance Initiative (2008a), p. 8.

[718] The interviewees confirm that measures such as ensuring that the building and machinery are working at optimum performance levels and implementing efficiency measures represent standard procedures in property management because they contribute to enhancing the overall building efficiency.

[719] See TMW Immobilien Weltfonds (April 2010), pp. 16, 49; British Land (2010d); Hammerson (2009), pp. 10, 12, 29; Land Securities Group (2009), pp. 22, 28; Stockland (2009a), p. 51; the majority of the interviewed investors outsourced their property management to external contractors. This may be one reason why such building management guidelines are not widely prevalent among the surveyed German investors.

[720] See Interviews; see also TMW Immobilien Weltfonds (April 2010), pp. 32, 49; British Land (2010d), p. 1; Stockland (2009a), p. 51.

similar procedures.[721] Finally, industry organizations publish manuals providing guidance on the development of sustainable building management procedures. For instance, the EPA's Building Upgrade Manual outlines building operations-related measures that can enhance the energy performance of properties.[722]

5.4.2.2 Value-added Sustainability Approaches in Building Management

Apart from the ongoing maintenance- and operations-related building management activities, property companies must ensure that their overall sustainability objectives are explicitly considered in their long-term capital expenditure planning. In general, there exist broad arrays of technologies to enhance the (environmental) sustainability performance of buildings. Since the energy consumption and CO_2 emissions associated with the heating, ventilation, air-conditioning and lighting of buildings are at the forefront of sustainability concerns in the real estate industry, the most frequently discussed building upgrade measures pertain to the installation or upgradation of high-efficiency electric lighting, water-saving devices, rain water harvesting systems, energy use reducing façades, automatic sub-meters, building management systems, on-site low-carbon energy sources, sealing of air leakages in the building envelope and the replacement of inefficient HVAC appliances and boilers.[723]

The realization of certain measures to reduce energy consumption and cut emissions in individual assets depends on the specific circumstances of the building (e.g., building quality, age and structure; current and prospective tenants; local property market standards and climate conditions), the characteristics of the prospective measure and the sophistication and expectations of the property owner.[724] Overall, the potential building upgrade measures must

[721] For example, British Land and TMW Pramerica describe their sustainable building management approaches in publicly available documents; see British Land (2010d), p. 1; TMW Immobilien Weltfonds (April 2010), pp. 32, 49.

[722] Cf. Ceres/Investor Network on Climate Risk (2009), pp. 21–24; the EPA has outlined a sequenced approach to upgrade the energy efficiency of buildings that comprises retro-commissioning, lighting upgrades, supplemental load reduction and upgrades of the air distribution, heating and cooling systems.

[723] Cf. McAllister, I., et al. (2009), pp. 14 et seqq.; Ceres/Investor Network on Climate Risk (2009), pp. 16 et seqq.; Pöschk, J. (2009), pp. 245–319; Ciochetti, B. A./McGowan, M. D. (February 2009), pp. 33 et seqq.; Lederer, M. M. (2008b), pp. 66 et seqq.; World Business Council for Sustainable Development (July 2008), pp. 50 et seqq; World Business Council for Sustainable Development (August 2009), p. 6; Levine, M./Ürge-Vorsatz, D. (2007), pp. 393 et seqq.; Ürge-Vorsatz, D., et al. (2007); McAllister, I./Sweett, C. (2007), pp. 12 et seqq; Siemens Real Estate (2006); heating, ventilation, cooling and lighting represent the main forms of energy consumption in office buildings; see Chapter 3.2.5; see also Gänßmantel, J., et al. (2006), p. 210; in contrast to major refurbishments, potential buildings upgrades in the use-phase of buildings typically take place while the property is occupied. This fact clearly reduces the scope for action.

[724] In addition, the current legislation (ENEV) affects the realization of individual measures. For example, the Energy Saving Ordinance (ENEV §9) requires that the entire building must meet certain energy efficiency standards defined in the ENEV whenever 10% or more of a building's envelope (e.g., façade or windows) is upgraded. As a result, property owners may be obliged to implement more comprehensive building upgrade measures than they consider appropriate. This mandatory obligation poses an additional risk. For ex-

be differentiated. First, energy-efficiency improvements relating to the replacement of the existing plant and machinery (e.g., major upgrades in a building's envelope due to air leakage, replacement of inefficient HVAC appliances or boiler refurbishment) are only executed either when the current or prospective tenants demand more sophisticated systems (e.g., because of high energy costs for tenants) or when the systems themselves malfunction or break down. When a building has well-functioning technical equipment that, however, consumes more energy and water than the latest technical systems, the question arises as to whether it makes financial or ecological sense to dispose of such equipment and purchase new replacements. It often makes neither ecological nor economic sense to replace well-functioning equipment, because the new equipment will consume a substantial amount of raw material and energy in its manufacturing process.[725] Second, eco-efficiency improvement opportunities that relate to the implementation of new technical building systems (e.g., automatic sub-meters or on-site energy sources) can be adopted at any stage of a building's lifecycle. The uptake of such measures is solely dependent on the economic benefits that they provide. Apart from building-related considerations, the sophistication level and expectations of the property owner influence the adoption of eco-efficiency improvements. At this juncture, what is important is the thoroughness of the process of identifying and assessing potential environmental building upgrade investments, investors' targeted performance levels for their property stock, their targeted payback benchmarks for energy-efficiency investments, their financial capabilities to invest in the existing portfolio and their expectations in terms of future tenant demand, energy prices and legislation.[726] Eventually, the realization of capital investments to improve a building's eco-efficiency is influenced by a multitude of factors.

To ensure the most effective employment of capital, property owners have to thoroughly examine the long-term financial and environmental costs and benefits of individual upgrade measures. This analysis must permit the comparison of (higher) initial capital outlays that would be necessary to further improve a building's sustainability performance against the benefits arising from a better sustainability performance, for example, lower running costs or higher rents. At this point, the interviewed investors, in general, have not fixed firm pay-

ample, tenants may leave a building if they are neither interested nor willing to contribute to the mandatory defined energy efficiency standards of the building. See Deutscher Bundestag; Lederer, M. M. (2008b), p. 164.

[725] See Interviews; see also Ciochetti, B. A./McGowan, M. D. (February 2009), pp. 27–28.

[726] All interviewees confirm that the most decisive factor in the realization of eco-efficiency investments and upgrade measures is the payback period. It is, however, influenced by future energy prices and tenant demand; see also Hammerson (2009), p. 10; Stockland (2009a), p. 50; Stockland (2009b), p. 3; Stockland (2008), pp. 12, 30; British Land (2009a), p. 22.

back thresholds that their capital expenditures have to achieve in order to be considered for implementation. The required return on investments in property upgrades depends on a multitude of factors related to the specific circumstances of a building, such as location, age, prospective rent levels, tenant demand and future selling prices. Accordingly, defining firm financial performance thresholds to determine the realization of eco-efficiency investments is not seen as an appropriate approach.[727] In the event that the property owner cannot realize certain energy efficiency opportunities because either the payback periods are too lengthy or the company's financial capabilities are constrained, the financial analysis of eco-efficiency investments has to be supplemented by an investigation of alternative financing mechanisms. At this juncture, energy performance contracts, whereby a third party funds an initiative and is repaid from the savings associated with the investment, present one approach to overcome these problems.[728]

With regard to the assessment and realization of eco-efficiency opportunities, another important question relates to whether and how property companies factor the cost of (future) emissions into their capital expenditure planning.[729] In general, the expected cost benefits (e.g., reduced service charges and costs of operations due to reduced energy consumption) or the improvement in the overall competitive position of a building (e.g., higher tenant satisfaction and retention or better marketability) must justify eco-efficiency investments in existing buildings. In addition, in the U.K. and Australia, the (prospective) introduction of emissions trading schemes induced an increasing number of property companies to develop procedures to understand and factor the influence of future emission costs in their capital expenditure planning.[730] Thereby, companies calculate either the costs of voluntarily offsetting their carbon emissions or the expected penalties imposed by emissions trading schemes and, on this basis, include a benchmark cost for emissions in their capital investment planning.[731] It is worth noting that the carbon finance topic is a new one for property companies

[727] See Interviews; by contrast, Stockland publicly communicated that opportunities with paybacks of four years or less are investigated for inclusion in operating budgets, see Stockland (2009a), p. 50.

[728] Cf. Kok, N., et al. (2010), p. 12; Hammerson (2009), p. 10; Quint, R. (2009); in addition, the investment community initiated funds that focused on energy efficiency investments in the existing property stock. For instance, APG Asset Management has created and co-funded a dedicated fund to finance energy efficiency retrofits; see Kok, N., et al. (2010), p. 12.

[729] Cf. Carbon Disclosure Project/Bundesverband Investment und Asset Management (2007), p. 53.

[730] Cf. British Land (2009a), p. 25; Stockland (2009b), p. 3; Hammerson (2009), p. 14; Land Securities Group (2009), p. 21; Stockland (2008), pp. 12, 30; for further information on environmental legislation in the U.K. and Australia, see Chapter 3.2.1.

[731] For example, Hammerson, in anticipation of the Carbon Reduction Commitment (CRC), started evaluating the impact of a carbon cost of £12 per metric ton in its existing assets; see Hammerson (2009), p. 14; British Land became carbon neutral in 2008 and started offsetting all of its carbon emissions from Scope 1 and 2 activities. By voluntarily offsetting its carbon emissions, British Land realized a carbon benchmark cost

and that they have only recently begun to take into account prospective emission costs in their decisions pertaining to eco-efficiency investments. Accordingly, more sophisticated approaches are likely to be devised in the future.[732] Since there are—at present and in the foreseeable future—no costs pertaining to carbon emissions in Germany, the interviewed investors have yet to develop methodologies for considering carbon costs in their capital expenditure planning.[733] However, individual investors have indicated that carbon emission costs have become increasingly important for the competitive positioning of buildings because some tenants are committed to a carbon-neutral corporate policy and thus take into account the costs incurred to offset the CO_2 emissions of rented space.[734]

The sustainability certification of existing buildings constitutes another important sustainability consideration in a property company's long-term capital expenditure planning. The analysis of whether and when an individual building requires sustainability certification in order to maintain its future competiveness is always an essential part of investors' regular asset reviews.[735] However, only those investors that have established the sustainability certification of buildings as the central pillar of their sustainability policy conduct more detailed analyses. In particular, they assess the opportunities and associated costs for certifying the buildings in their property stock.[736] For this purpose, one investor developed a standardized "quick check" tool to systematically examine individual buildings' potential to reach certification levels. Reasons that deter many investors from more actively pursuing the sustainability certification of existing buildings include the prohibitive costs of the certification process, the expectation of achieving lower certification levels for reasons that are not related to building quality (e.g., incomplete building documentation) and the minimum operational energy and water performance prerequisites in sustainability certification systems. It is often neither economically nor environmentally useful to replace well-functioning technical equipment that, however, consumes too much energy or water, with new equipment, when

prior to the introduction of the CRC; see British Land (2009a), pp. 23–25; Likewise, Land Securities introduced a carbon benchmark cost prior to the CRC by investing the money it would have cost to offset its carbon emissions in improving the energy efficiency of its property stock; see Land Securities Group (2009), p. 21.

[732] With regard to assessing the financial and environmental costs and benefits of eco-efficiency investments, Stockland has instituted probably one of the most highly developed approaches. Its decision-making is informed by its own carbon abatement cost curve and related target-setting tools, through which Stockland is able to quickly model the costs of reducing emissions across its portfolio as well as at the individual asset level; see Stockland (2009a), p. 50; Stockland (2009b), p. 3; Stockland (2008), pp. 12, 30.

[733] None of the interviewees indicated that they considered carbon emission costs in their capital expenditure planning.

[734] See Interviews; occupants that have a carbon neutral corporate policy are, for example, Deutsche Bank, Munich RE and Google.

[735] See Interviews.

[736] See Interviews.

the latter will require substantial raw material and energy for its manufacture, transportation and installation.[737]

Overall, a formal sustainability approach strengthens the consideration of sustainability issues in a company's long-term capital expenditure planning. First, it promotes the adoption of a long-term perspective in the capital expenditure planning process, which is important because eco-efficiency investments mainly create value in the long run. Second, a formal sustainability approach contributes to companies regularly refining their planning process so as to keep track of the latest developments in the property industry (e.g., consideration of CO_2 emission costs). Third, it has prompted companies to consider additional technological building tools in their capital investments (e.g., implementing an advanced metering infrastructure).[738] Finally, ambitious sustainability performance targets will undoubtedly entail that property companies more explicitly consider sustainability opportunities in specific investment decisions, such as in the replacement of technical building systems, and more thoroughly screen their portfolio for energy efficiency improvements (e.g., on-site energy sources).

5.4.3 Consideration of Sustainability in the Procurement of Goods and Services

The last element of a sustainable asset and property management strategy is to include a consideration of the culture or modus operandi of contractors in a company's sustainability approach.[739] Despite a lack of direct control over these activities, investors can influence the decisions and operations of contractors by setting clear expectations. To ensure that the suppliers and service providers acting on behalf of the company operate in line with the company's sustainability objectives, the surveyed U.K. and Australian property companies have devised certain sustainable supply chain management guidelines or sustainable procurement policies. These policies usually cover the entire spectrum of contractors, including builders, civil engineering contractors, property and facility management providers, and security and cleaning contractors. Health and safety issues, labor standards and the contractors' addressing of environmental sustainability issues are at the forefront of these property companies' sustainability concerns in relation to the business operations of their service providers.[740]

[737] See Interviews; see also Ciochetti, B. A./McGowan, M. D. (February 2009), pp. 27 et seqq.
[738] See Interviews.
[739] See Chapter 4.1 and Chapter 4.2.
[740] See Chapter 4.1.3; see also British Land (2010b), p. 40; British Land (2010b); Hammerson (2009), p. 35; Land Securities Group (2009), p. 23; Stockland (2009a), pp. 16, 33, 37; Investa Property Group (2007b); Newell, G. (2008); UNEP Finance Initiative (2008a), p. 8; Newell, G. (2008), p. 536.

This chapter discusses only the last concern in greater detail because of the specific research focus of the present dissertation.

Property and facility managers play key roles in the management and operations of buildings. Accordingly, many interviewees regard the inclusion of external property and facility managers in a company's sustainability approach as a prerequisite for the success of their sustainability efforts.[741] There are various ways in which property investors can ensure that external service providers actively contribute to their sustainability policies. First, property companies can preferably select and mandate sustainable property and facility management firms. Second, property investors can incorporate sustainability covenants into their contractual agreements with third-party property and facility management firms. Both types of supplier engagement have been implemented in the real estate industry. The preferable selection of sustainability-oriented service partners requires property companies to assess the sustainability performance of prospective contractors. For this purpose, the surveyed U.K. and Australian property companies implement sustainability questionnaires as part of their tender requests in order to ensure that the corporate behavior and overall business operations and capabilities of their potential suppliers comply with their sustainability policies and expectations.[742] Although this approach has been considered by a few of the interviewed German property companies, they have yet to adopt it.[743] Sustainability covenants in contractual agreements with service providers can comprise environmental operating obligations (e.g., requirements in relation to collecting and reporting environmental performance data, implementing a "switch-off" policy to ensure that electrical equipment is turned off when not required, using environment-friendly cleaning materials, environment-appropriate landscaping and the appropriate waste management and recycling procedures) and performance fees linked to the attainment of certain environmental goals (e.g., certain target reductions in energy and water consumption or increases in waste recycling). Such environmental operating obligations as well as environmental performance fees are currently stipulated in contractual agreements between service providers and U.K., Australian and German property investors.[744] At this juncture, however, the interviewed German investors integrate only a selec-

[741] See Interviews.
[742] Cf. Investa Property Group (2010c); Stockland (2009a), p. 37; Land Securities Group (2009), p. 23; Jones, P., et al. (2009), pp. 527–528; UNEP Finance Initiative (2008a), pp. 7–9.
[743] See Interviews; in this context, the publically available sustainability documentation of contractors and the existence of an ISO 14001 certification were suggested as indicators for assessing contractors' sustainability performances.
[744] See Interviews; see also Land Securities Group (2009), p. 23; Stockland (2009a), p. 37; UNEP Finance Initiative (2008a), p. 8.

tion of the aforementioned covenants into their contractual agreements.[745] Environmental performance fees, in particular, are regarded as the most powerful tool to transform third-party property and facility managers into active agents who promote an investor's sustainability approach.[746] However, the property market has yet to develop a comprehensive, common standard for the inclusion of sustainability issues in contractual agreements with external service providers. It is worth noting that only property companies with a formal sustainability approach emphasize the importance of contractors for successfully improving the environmental performance of buildings. This situation underpins the hypothesis that a formal sustainability approach results in more comprehensive and more detailed property portfolio management procedures.

Apart from property investors asking for sustainable services, many property and facility managers have started incorporating sustainability considerations into their services through their own initiatives. In this way, they expect to gain competitive advantages in tender processes.[747] For this reason, it can be reasonably assumed that externally-provided, sustainability-oriented property and facility management services will rapidly become commonplace.[748] Although the property and facility management industry is keen to embrace the environmental sustainability agenda, Hinnells et al. (2008) suggested that the length of property and facility management contracts impedes the provision of more sustainable services. They argue that energy-saving measures must have a very short payback to be worthwhile to contractors because their contracts can be of a duration as short as three years.[749]

In addition, sustainable supply chain management approaches can cover the sourcing and use of sustainable materials (e.g., locally available materials or FSC-certified timber) in the development or refurbishment processes.[750] This aspect is of particular importance because building sustainability certification systems such as BREEAM, LEED and DGNB award credit points for the use of sustainable materials.[751] Moreover, property companies can purchase accredited green power—that is, electricity from renewable energy sources—for the

[745] Individual investors indicate that they have only recently begun to introduce sustainability covenants into their contractual agreements with their service providers. In general, companies tend to start simple by adopting only a few, sustainability awareness-raising covenants. They do, however, plan to continually build on their approach and introduce more demanding sustainability covenants in the future.
[746] See Interviews.
[747] See Interviews.
[748] Individual interviewees also indicate that property managers increasingly suggest measures for improving the environmental performance of buildings within their ordinary property management services.
[749] Cf. Hinnells, M., et al. (2008), p. 547.
[750] Cf. Hammerson (2009), p. 35; Land Securities Group (2009), p. 27; UNEP Finance Initiative (2008a), p. 8.
[751] See Chapter 3.2.2.

operation of their properties. Utilities around the world now offer green power to their customers, generally at a premium price.[752] Property companies that currently use green power to supply a part of their electricity consumption include ECE, Investa Property Group, PRUPIM and Macquarie Office Trust.[753] In particular, high-end occupants with a carbon-neutral corporate policy in place are sometimes willing to pay more for green power. The interview findings in this regard, however, show that neither the surveyed property companies nor their tenant base have considered the sourcing of green power. This situation may change in the future if the introduction of carbon taxes makes green power prices more competitive. Finally, the sophistication levels of the energy sector also influence the use of green power in different countries. In particular, green power is likely to be available at more competitive rates in countries wherein the government provides substantial financial support to promote the production of renewable energy.[754]

5.5 Sustainability Issues in External Corporate Reporting

5.5.1 Overview of Sustainability Reporting in the Real Estate Industry

During the last few years, the growing interest of various stakeholders, including NGOs, investors and customers (tenants), in the sustainability performance of companies has made sustainability reporting an increasingly important component of a comprehensive sustainability management approach.[755] Its main purpose is to provide stakeholders with the information required to assess a company's material sustainability concerns, its sustainability approach, the effectiveness of its sustainability efforts and the potential for new business opportunities. By creating transparency regarding the sustainability of a company's activities, sustainability reporting helps a company manage its relationship with external stakeholders.[756] The mainstream position of sustainability reporting is reflected in the fact that more than 80% of the world's largest firms now report their sustainability initiatives. At present, the majority of these reporting companies—that is, 77%—use the GRI's Sustainability Reporting Guidelines as the basis for this disclosure.[757] Likewise, Kok et al. (2010) suggested that sustainability reporting is the norm rather than the exception among property companies. In this regard, too, Australian property companies blaze the trail, with all 13 of the surveyed respondents publicly disclosing their sustainability information. In the European data sample, 80% of the listed and 40% of the private property investment vehicles pro-

[752] Cf. U.S. Department of Energy (2008), p. 1.
[753] Cf. UNEP Finance Initiative (2008b), pp. 48 et seqq; Newell, G. (2008), p. 537; ECE (2008).
[754] Cf. Kok, N., et al. (2010), p. 43.
[755] See Chapter 3.2.4, Chapter 4.1 and Chapter 4.2; see also Pivo, G. (2009), pp. 488–489.
[756] Cf. Global Reporting Initiative (2006), p. 3.
[757] Cf. KPMG (2009), pp. 13, 35.

vided sustainability information to external stakeholders. It is particularly worth noting that only 45% of the Australian and 8% of the European property companies claimed to use the GRI Sustainability Reporting Framework, although this reporting tool has clearly emerged as the standard for sustainability reporting in other industry sectors.[758]

In the aforementioned study, German property investors were somewhat insufficiently covered due to low response rates.[759] The present study's interview findings indicate that sustainability reporting is not commonplace among German property investors, with only two of the surveyed property companies providing a sustainability report for the financial year 2010.[760] However, an increasing number of companies have begun to recognize the important role of sustainability reporting and plan the public disclosure of sustainability information for the financial year 2011 or 2012.[761] However, neither the property companies that already provide sustainability information nor those who plan to do so in the future seek to adopt standardized sustainability reporting guidelines such as the GRI Sustainability Reporting Framework in the foreseeable future.[762] The overall increasing importance of sustainability, marketing effects and peer pressure are cited as the main reasons for the implementation of sustainability reporting.[763] Eventually, it is worth noting that only companies with a formal sustainability approach tend to work toward the realization of sustainability reporting.

5.5.2 Key Elements of a Sustainability Reporting Framework

Sustainability reports present the most crucial component of a company's sustainability reporting. Thus, the present chapter provides a detailed discussion on the process of developing such a report. In addition to sustainability reports, companies generally provide sustainability information in dedicated sections on their corporate websites.[764]

[758] Cf. Kok, N., et al. (2010), p. 40; in this study, U.S. property companies lagged behind with 37% of the listed and 19% of the private property vehicles reporting on sustainability. Of these, only 4% used the GRI Reporting Standard.
[759] For example, only two listed German property companies responded to this questionnaire study.
[760] Cf. UBS Real Estate KAG (September 2010); TMW Immobilien Weltfonds (April 2010).
[761] See Interviews.
[762] See Interviews.
[763] In the academic literature, the increasing interest of investors is frequently cited as one reason that companies provide sustainability information. In relation to sustainability, however, none of the interviewed companies has been actively approached by investors.
[764] See Chapter 4.1.3; see also Pricewaterhouse Coopers/Craib Design & Communications (2010), p. 4.

At the moment, there are no mandatory accounting rules for preparing a sustainability report.[765] Although voluntary reporting standards, such as the GRI and the AccountAbility (AA) 1000 Assurance Standard, have gained widespread acceptance in some industry sectors, companies must individually assess the usefulness of adopting such standards.[766] On the one hand, established sustainability reporting frameworks set comprehensive and widely accepted but challenging standards whose implementation requires considerable efforts. On the other hand, a company's adherence to widely accepted reporting procedures can be interpreted as representing the importance attributed by the company to transparency in reporting. For this reason, the determination of an appropriate reporting standard constitutes the first step in realizing or reviewing a corporate sustainability reporting framework. Factors that have to be considered in this decision include the reporting standards of rivals, market standards and the requirements and needs of stakeholders, particularly investors. For example, research into the SRI policies of its top-21 equity investors led Hammerson to apply the GRI Sustainability Reporting Framework.[767]

Regardless of whether a company adopts an established sustainability reporting standard or uses an internally developed reporting standard, implementing a sustainability reporting process requires companies to determine an appropriate reporting framework (e.g., reporting format, frequency of reporting and external assurance) and the key elements of its content.[768] With regard to the reporting format, PricewaterhouseCoopers LLP (2010), analyzing the sustainability reporting procedures of 75 companies, found that the majority of companies disclosed the relevant information in stand-alone sustainability reports.[769] The credibility of a company's sustainability reporting presents another important issue in a reporting framework. Organizations may either have systems of internal control or use external assurance to verify the accuracy of their claims. Although the GRI recommends external assurance for

[765] In some countries, however, there are mandatory reporting requirements pertaining to individual sustainability aspects. For example, Australian property companies have to report their CO_2 emissions under the National Greenhouse and Energy Reporting Act 2007; see Chapter 3.2.1.

[766] For an in-depth description of the GRI Sustainability Reporting Framework, see Chapter 4.1.4; the AA 1000 Assurance Standard is a generally applicable standard for assessing and strengthening the credibility and quality of organizations' sustainability reporting; see The Sigma Project (2003), pp. 1 et seqq.; in addition, the Property Council of Australia has developed the "Draft Guide to Corporate Responsibility Reporting in the Property Sector"; however, this guide has not managed to gain widespread attention outside Australia; see the Property Council of Australia (2009).

[767] Cf. Hammerson (2009), p. 10, 40.

[768] Cf. Pricewaterhouse Coopers/Craib Design & Communications (2010), p. 3; Global Reporting Initiative (2006), pp. 6 et seqq., 37 et seqq.

[769] Cf. Pricewaterhouse Coopers/Craib Design & Communications (2010), p. 4; the study sample comprises companies across various industry sectors from around the world. Apart from presenting a stand-alone sustainability report, companies have the option of providing sustainability information in their financial or annual reports.

sustainability reports, PricewaterhouseCoopers (2010) in their survey revealed that only 27% of the companies that reported on the basis of the GRI Sustainability Reporting Framework externally verified their reports.[770] The Australian and U.K. property companies surveyed in the present dissertation annually publish extensive, stand-alone, externally verified sustainability reports.[771] In contrast, the previous sustainability reports provided by the surveyed German property investors have not been externally verified.[772] In addition, most of the interviewed investors who plan to publish their sustainability information in the near future have yet to decide on the format (stand-alone reports vs. those combined with financial reports) and whether they should provide external verification for their reports.[773]

Determining what to report—that is, the content of the report—constitutes the most important task in the disclosure of sustainability information.[774] First, a company's sustainability report must discuss not only the sustainability themes that have a material impact on a company's business operations but also those that are materially affected by a company's operations. Materiality in sustainability reporting generally means that the discussed sustainability issues affect a company's future performance or influence the decisions of stakeholders. The best sustainability reports qualify and quantify the expected impacts of individual sustainability issues on a company. In addition, sustainability reports should outline a company's process of determining its material sustainability concerns.[775] Second, such a report must enable external stakeholders to understand the company's sustainability management approach and assess its sustainability performance.[776] The disclosed information should ideally show how a sustainability management approach responds to a company's material sustainability concerns. For this purpose, a sustainability report must describe a company's sustainability policy, goals and activities. In order to provide external stakeholders with the information required to assess a company's sustainability performance and the effectiveness of its sustainability approach, a sustainability report, most importantly, must contain the relevant environmental performance data. The surveyed U.K. and Australian property compa-

[770] Cf. Pricewaterhouse Coopers/Craib Design & Communications (2010), p. 22.
[771] Cf. British Land (2009a); Hammerson (2009); Land Securities Group (2009); Investa Property Group (2009b); Stockland (2009a); see also Chapter 4.1.3.
[772] Cf. UBS Real Estate KAG (September 2010); TMW Immobilien Weltfonds (April 2010).
[773] See Interviews.
[774] It is important for all companies to appropriately define the reporting content because established reporting guidelines such as the GRI enable companies to adopt different levels of reporting (i.e., reporting levels A, B and C); see Global Reporting Initiative (2006), p. 5.
[775] Cf. Pricewaterhouse Coopers/Craib Design & Communications (2010), pp. 10–11; Global Reporting Initiative (2006), pp. 8–9.
[776] Cf. Global Reporting Initiative (2006), pp. 19 et seqq.

nies publish extensive information on each of the aforementioned content issues.[777] With regard to the content of sustainability reporting, the interviewed German property investors regard the disclosure of environmental performance data as the central pillar of sustainability reporting. They reckon that without concrete performance data, sustainability reporting remains meaningless.[778] Third, a sustainability report is thought to help organizations manage their relationship with external stakeholders. To this end, the reporting company should precisely identify its stakeholders and illustrate in its report how it has responded to their reasonable expectations and interests.[779] Finally, in order to determine and communicate the boundaries of its sustainability report, the reporting company is required to clearly define the range of entities (e.g., subsidiaries, joint ventures or certain portfolios) whose sustainability concerns and performances are covered in the report.[780] With regard to these issues, PricewaterhouseCoopers (2010), in its survey on the sustainability reporting procedures of companies, revealed that 37% of the companies explained the materiality of the relevant sustainability issues and 88% of the companies identified their major stakeholders in their reports. Moreover, 80% and 85% of the surveyed sustainability reports contained the company's corporate profile and explained the report's scope, respectively.[781]

5.6 Section Summary

Chapter 5 has two main objectives. First, it assesses the viability of the sustainability strategies and mechanisms proposed in Chapter 4.2. Second, it provides information on the mode of operation of the most important sustainability practices in property portfolio management.

Overall, the interview results indicate that a company's decision to implement a formal sustainability approach is related to its investment policy. Property companies that primarily focus on core-plus or prime premises for investment often advocate an explicit sustainability management approach, while those that mainly invest in medium-quality or value-added buildings tend to hesitate to consider a formal, holistic sustainability management approach that transcends their previous business operations. In this regard, the interview findings suggest that these differences in companies' sustainability approaches arise mainly from the

[777] See Chapter 4.1.3; see also British Land (2009a); Hammerson (2009); Land Securities Group (2009); Investa Property Group (2009b); Stockland (2009a); Newell, G. (2008), p. 529.
[778] See Interviews.
[779] Cf. Pricewaterhouse Coopers/Craib Design & Communications (2010), pp. 20–21; Global Reporting Initiative (2006), pp. 10–11.
[780] Cf. Pricewaterhouse Coopers/Craib Design & Communications (2010), pp. 12–13; Global Reporting Initiative (2006), pp. 12–13.
[781] Cf. Pricewaterhouse Coopers/Craib Design & Communications (2010), pp. 10 et seqq.

property occupants' varying interests in the sustainability of rental space. In the interviewees' opinions, it is the high-end property users who are mainly interested in sustainability.

As discussed in this chapter, the implementation of a formal sustainability policy has emerged as a key component in the process of realizing a sustainability management approach. First, a sustainability policy highlights, to internal as well as external stakeholders, how important sustainability is for a company. In particular, a company's credible commitment to the sustainability agenda is regarded as important for enforcing the concept of sustainability in its business operations, because its employees might be skeptical of the profitability of a comprehensive sustainability management approach. Second, the process of defining and refining a sustainability policy regularly induces companies to thoroughly examine the way in which their business operations relate to the external environment. This analysis helps companies to better understand their stakeholders' needs and concerns and thus contributes to mitigating risks and creating business opportunities for the companies. Third, the interview results suggest that implementing a sustainability policy induces property companies to determine firm targets (e.g., reduction targets for energy use) for their building operations. Such targets are fundamental for companies working toward developing structured and systematic management mechanisms for continuously improving the operating efficiency of their property stock.

Beyond highlighting the importance of a formal sustainability policy, the interview findings identify that establishing organizational capabilities and resources, developing internal sustainability review procedures and adopting a comprehensive sustainability measurement and assessment framework are the cornerstones for the successful execution of a sustainability policy. With regard to the organization of employees, tasks and responsibilities, German property investment companies, like their U.K. and Australian rivals, either employed dedicated employees and/or founded sustainability working groups. The formation of cross-functional working groups, in particular, tasked with the implementation of individual sustainability projects (e.g., the development of a green lease), are regarded as the most appropriate way to ensure that sustainability becomes a "living" process in corporate business operations. A comprehensive sustainability measurement and assessment framework must capture the operational environmental performance data and analyze the details and condition of a property's sustainability-related building design attributes. At present, the interviewed German property investors indicate that improving their environmental performance measurement constitutes the most important sustainability measure for them. In this regard,

it is noteworthy that the interviewed investors increasingly (plan to) measure and publicly disclose their CO_2 emissions at the portfolio level, although—in contrast to the U.K. and Australia—there are no mandatory requirements to do so in Germany. In addition to these efforts, a company must set up internal sustainability review procedures to monitor whether its sustainability policy is properly executed, examine the effectiveness of its sustainability measures and regularly refine its sustainability approach. On the whole, defining a sustainability policy, setting up organizational capabilities and structures, adopting a suitable sustainability measurement and assessment framework and implementing internal review procedures have emerged as the key components of a sustainability management approach, constituting the sustainability management infrastructure on which all other sustainability activities are founded. Only those companies that lay these foundations can realize eco-efficiency improvement opportunities in their business operations.

On the basis of this sustainability management infrastructure, property companies can take the appropriate measures in property acquisition and development, tenant engagement, asset and property management and the procurement of goods and services to improve the environmental performance of their property stock. Due to the differences in investors' portfolios, the adopted sustainability activities can vary among property companies. With regard to property acquisition, the most important findings are that the surveyed investors typically avoid determining firm sustainability levels that must be met by prospective investments. Instead, they advocate the consideration of opportunities and costs to upgrade prospective investments to the targeted sustainability levels in their price formation processes. For this purpose, several investors have begun integrating additional sustainability criteria into their acquisition rules. These additional assessment issues include the presence or absence of an advanced metering infrastructure (e.g., smart meters) in buildings, the documentation of buildings (which is important for the certification of properties), the types of materials used in buildings and the ability and flexibility of buildings to meet certification levels and future regulations (e.g., ENEV 2012) through upgrades. In their property development or refurbishment processes, companies use the sustainability certification of buildings as a widely adopted sustainability approach. The interviewed investors generally do not expect that the required investment measures taken to achieve sustainability certification will contribute to improve the actual building quality or the environmental performance of the building. However, the great majority of newly constructed or majorly refurbished buildings are certified because either the prospective tenants or the market standards require some kind of sustainability label. In tenant engagement, German property investors tend to give less importance

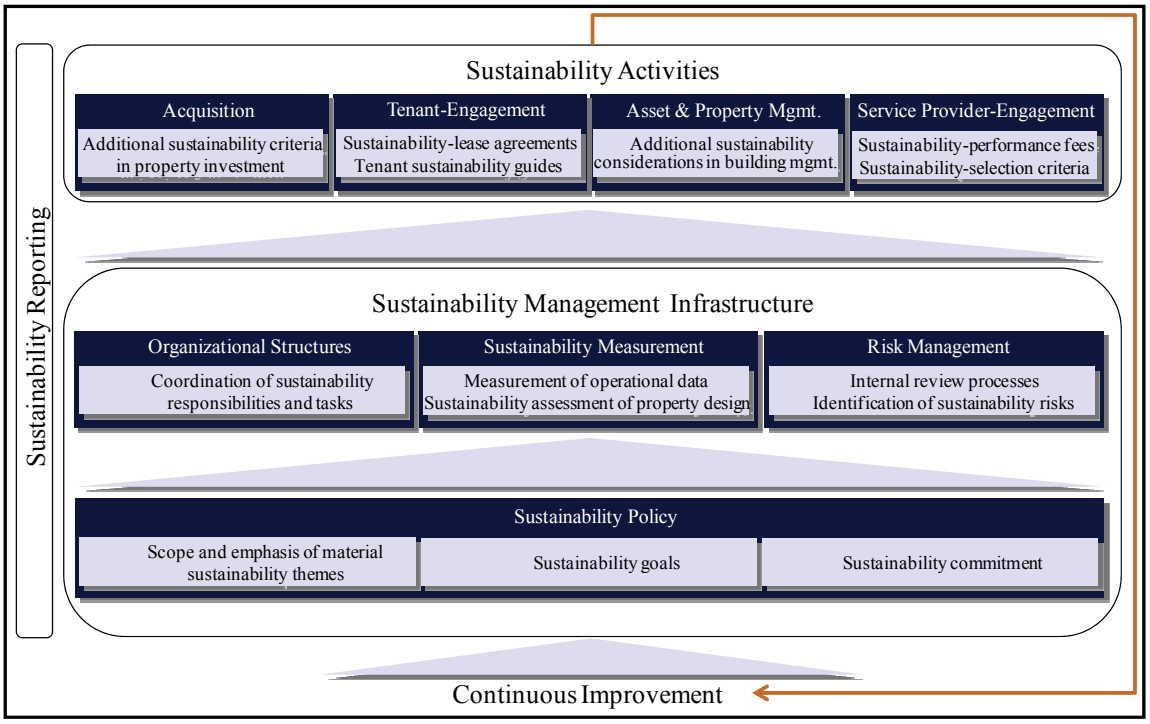
to sustainability measures—such as guidelines for inducing tenants to behave in a sustainable fashion (e.g., tenant sustainability guides, sustainable fit-out guides, fit-out waste guides and green travel plans) or dedicated sustainability meetings with occupants—than their U.K. and Australian rivals. Instead, overcoming the problem of misplaced incentives in the current lease structures and developing green leases are at the forefront of their sustainability activities in tenant engagement. Even though several interviewees currently do not promote the adoption of sustainability obligations in lease contracts through their own initiatives, mandatory legislation and tenant requirements increasingly disseminate the green lease concept in the marketplace.[782] In this regard, it is worth noting that many green lease proposals at present do not attempt to better align the financial interests of the parties to the lease contract and thus do not address the misplaced incentive problem. In contrast, green leases are thought to raise awareness and oblige the respective parties to behave in a certain manner. In order for a company's tenant-engagement measures to succeed, they need to be accompanied by sustainable building management procedures. At present, there is a broad array of cost-effective opportunities that can be utilized to improve the (environmental) sustainability performance of buildings. At this point, the most important aspect of a sustainability management approach is to ensure that asset and property managers appropriately consider sustainability issues in their ongoing work streams and thereby facilitate the attainment of an optimal sustainability performance level in the existing property stock. With regard to promoting the adoption of sustainability-oriented building management practices, only a few companies advocate a standardized approach in the form of introducing pre-defined sustainable building management operating guidelines. Another important aspect in the realization of sustainable building operations is the culture or modus operandi of contractors. Despite a lack of direct control over these activities, investors can influence the decisions and operations of contractors by setting clear expectations. For this purpose, property investors can avail of the opportunity to preferably select and mandate sustainable property and facility management firms and/or to incorporate sustainability covenants into their contractual agreements with third-party property and facility management firms. The interview results indicate that there exists no widely-adopted standard approach as yet. In this regard, linking performance fees to the attainment of certain environmental goals (e.g., certain reductions in energy and water consumption or increases in waste recycling), as part of the contractual relationship between investors and contractors, must be regarded as the most effective

[782] While the interviewed investors generally endorse green leases, they do not promote the adoption of sustainability obligations in lease contracts through their own initiatives because they believe that additional obligations could make a building less attractive to prospective tenants. In addition, they do not assume that the current sustainability contents of green leases need to be spelled out in a legally binding agreement in order to be realized.

mechanism because this best aligns the financial interests of the parties to the contract. In the end, sustainability reporting represents the last element of the sustainability management approach. Sustainability reporting is commonplace in other industry sectors as well as among U.K. and Australian property companies. In contrast, the surveyed German property investors typically do not provide sustainability information, with only two of the surveyed companies publishing a sustainability report. However, the interview results reveal that all of the companies with a formal sustainability approach in place plan to release sustainability information in the near future. Accordingly, sustainability reporting is likely to become increasingly common among German property investment companies.

Figure 18 presents a summary of the fundamental structure of the proposed sustainable property portfolio management approach. This figure outlines the measures that a company must take to supplement the management activities of its established portfolio management processes (see Table 3). As shown in the figure, the consideration of sustainability in a property company's portfolio management process is an ongoing task. A company's sustainability policy and subsequent management activities must be regularly adapted to the changing external environment and the progress of its previous measures. Parallel to these efforts, sustainability reporting provides relevant sustainability information and updates to external stakeholders. Because the implementation of an effective sustainability management process must encompass all of a company's business procedures, the proposed approach includes both top-down and bottom-up measures. In addition, Chapter 5 confirms the validity of the sustainability management process that was theoretically developed in Chapter 4.2. It shows that the proposed framework is applicable in real estate practice as companies plan to adopt a number of its elements. However, the interview results also indicate that the usefulness of individual measures depends heavily on the characteristics of a company's portfolio. Accordingly, the proposed sustainability management process is not meant to be prescriptive; rather, it represents a guideline for property investors on how to address sustainability issues in the real estate sector. Overall, Chapter 5 reveals that effectively addressing the sustainability agenda requires that property companies adopt a comprehensive management approach.

Figure 18: Structure of the proposed sustainable property portfolio management approach



Source: Own illustration.

Beyond the measures that have been identified to supplement property companies' established portfolio management processes, Chapter 5 provides valuable indications of the sustainability agenda's potential long-term impacts on property portfolios. First, sustainability issues—in particular, the sustainability certification of buildings and tenants' varying degrees of interest in sustainability—contribute to a more marked differentiation of real estate markets. One result of this is that sustainability is expected to impact prime properties more strongly than medium-quality buildings. This increased vulnerability of prime properties is due to the continually tightening sustainability standards in the marketplace, coupled with prime tenants seeking to occupy the most sustainable buildings. Chapter 5 also confirms that implementing a formal sustainability approach leads to more comprehensive, rigorous and detailed property portfolio management operations. The proposed sustainability management process cannot be applied as a separate, stand-alone corporate strategy; rather, it must be understood as part of a more thorough and holistic approach to managing real estate portfolios. This is reflected, for example, in the fact that companies with a formal sustainability approach tend to maintain a more detailed and more extensive set of operational performance data, define concrete reduction goals for the operational performance of their portfolio, articulate more detailed acquisition rules, engage more intensively with tenants and actively engage external managers to contribute to increasing the operational efficiency of buildings. In addition, such companies are likely to examine potential sustainability drivers

more thoroughly in order to facilitate the realization of their sustainability approach. Finally, a formal sustainability approach encourages companies to set up procedural structures that facilitate the continuous improvement of the operational efficiency of their portfolios. Property companies implement the abovementioned sustainability measures in order to improve the environmental and social performance of their property stock, and thus become better able to address the requirements of their tenants. Property investors particularly expect that the enhanced efficiency of their buildings will mitigate the increased deterioration of their property stock that results from the relentless requirements of the sustainability agenda. As shown in Chapter 5.3.3, the strategic property portfolio management model is best suited to the development of an understanding of the sustainability agenda's potential impacts on property portfolios. Because this model includes an analysis of the fundamental building attributes, it allows for the assessment of a company's aggregated property stock's vulnerability to the impacts of sustainability.

6 Summary and Concluding Remarks

The main impetus for this study was the overall lack of consensus on how to define a sustainable firm in the property industry. This academic void results from the absence of a comprehensive, common framework of generally accepted strategies, tools and measurements for considering sustainability in property portfolio management. In attempting to develop such a framework, this dissertation aims to provide guidance to property companies wishing to realize a sustainable management approach.

To begin with, the concepts of CSR, sustainability and property portfolio management provide the theoretical framework and structure for this evaluation. In this regard, it is especially important to use property portfolio management as the conceptual foundation because it ensures that the proposed sustainability management approach is linked to the prior management operations of property companies. Thereafter, the study analyzes a broad range of potential sustainability drivers in the real estate industry to identify the factors that induce a growing number of market participants to consider the sustainability agenda as a value driver in property portfolio management. In this study, the increase in regulatory requirements related to energy efficiency and CO_2 emissions and the heightened sustainability interest of tenants and investors emerged as important sustainability aspects influencing property companies.

Having determined the need to consider sustainability in a property company's business operations, Chapter 4 of this study develops the structure of a sustainable property portfolio management framework. To determine sustainability strategies and mechanisms for "greening" property portfolios, the dissertation draws on four different information sources: the relevant academic literature, CSR indices and their assessment criteria, CSR reports of the most sustainable property companies and the sustainability initiatives developed by non-governmental organizations. In Chapter 5, the dissertation discusses the viability of the proposed framework through a series of interviews with German property investors. In addition, the interviews explicate the sustainability management practices of German property investors. Overall, the interview findings indicate that a company's decision to implement a comprehensive, formal sustainability approach is related to its investment policy. For instance, companies with a primary investment focus on core-plus or prime premises often advocate an explicit sustainability management approach. In this regard, the interview findings suggest that the differences in companies' sustainability approaches arise mainly from the prop-

erty occupants' varying interests in the sustainability of their rental space. According to the interviewees' experiences, high-end occupants, in particular, are substantially interested in sustainability, whereas other tenants are relatively less interested. This study also reveals that implementing a formal sustainability policy, establishing organizational capabilities and resources, adopting a comprehensive sustainability performance measurement and assessment framework and developing sustainability risk management processes (particularly internal review processes) form the sustainability management infrastructure on which all other sustainability activities of a company are founded. Only if companies lay these foundations can they implement effective environmental management procedures in their day-to-day work streams. If not, their sustainability approach remains a matter of rhetoric rather than practice. The sustainability management infrastructure provides the basis for sustainability activities in the fields of property acquisition and development, tenant engagement, asset and property management and service provider engagement. Because of differences in investors' portfolios, however, the adopted sustainability activities can vary substantially among companies.

The detailed investigation of investors' sustainability management approaches and examination of the rationale behind their actions suggest some worthwhile conclusions. First, a formal sustainability approach induces property companies to attach greater importance to the operation of buildings and the building-related fundamentals of real estate investment and management. Accordingly, the realization of a formal sustainability management approach leads to more detailed and more comprehensive property portfolio management operations. The higher level of detail is reflected in, for example, the fact that property companies begin to measure a more detailed and more extensive set of operational performance data, define concrete reduction goals for the operational performance of their portfolios, establish more detailed acquisition rules, engage more intensively with tenants and actively involve external managers in the eco-efficiency improvement of the property stock. Eventually, as indicated in the "resource-based view of the firm" theory, the implementation of a formal sustainability management approach—accompanied by more detailed and more comprehensive property portfolio management operations—might create competitive advantages for companies by developing a better understanding of stakeholder needs and achieving greater resource efficiency. For this reason, the first hypothesis of the present dissertation is as follows:

"A formal sustainability approach in the real estate industry—in the form of defining a sustainability policy, setting up organizational capabilities and structures, adopting a suitable

sustainability measurement and assessment framework, implementing internal review procedures, establishing more detailed acquisition rules, engaging more intensively with tenants and actively involving external managers—results in a more detailed and more comprehensive property portfolio management approach, which, in turn, leads to increased operating efficiency and competitive advantages for a company and, eventually, to a superior financial performance."

Second, the majority of the reviewed property companies have only recently begun to address the sustainability agenda in a strategic manner. This situation underpins the notion that the implementation of a formal sustainability approach still represents a new type of corporate policy in the market place. However, an increasing number of property companies are working toward the formal consideration of sustainability in their business operations at a tremendous pace.[783] This trend will inevitably put pressure on the remaining property companies to adopt similar procedures. In addition, the growing importance and prevalence of public sustainability reporting will further reinforce the pressure on companies to adopt sustainable management procedures. Accordingly, the second hypothesis of this study is as follows:

"Since an increasing number of property companies are now formally considering sustainability issues in their business operations, property companies with an explicit sustainability approach are not expected to outperform others; however, companies without an explicit sustainability approach can be expected to underperform."

Third, according to the interviewees, the sustainability interest of tenants and environmental regulations, both of which vary across different property markets and property categories, present the most important sustainability drivers in the real estate sector. Therefore, the extent to which a property investor's business operations are affected by the sustainability agenda depends on the investor's portfolio composition (particularly building quality and regional diversification of investments). This entails that a property company's sustainability approach must be aligned to the peculiarities of its investment policy. Hence, the third hypothesis is as follows:

"A property company's sustainability approach to succeed—that is, to create shared value for both the company and the society—requires that it be aligned to the specific needs of its

[783] Apart from the interviewed German property investors, the Alstria Office REIT AG, IVG AG and ECE recently announced the implementation of sustainability initiatives.

tenants and to the environmental legislation of the property markets in which the company operates. Only by outlining opportunities to effectively address tenants' sustainability needs and environmental regulation will a property company's sustainability approach achieve economic as well as social benefits, strengthen corporate business operations and contribute to a superior corporate financial performance."

Fourth, the perpetually increasing sustainability standards in newly constructed and majorly refurbished buildings—induced by continuously rising requirements in environmental legislation and sustainability certification systems—lead to the deterioration of the existing property stock's market positioning. In general, tenants in the high-quality market sector, who are willing to pay top rents, expect the latest building standards. In contrast, tenants in the medium-quality market sector have a less comprehensive and less discerning set of tenant needs. In line with this situation, investors primarily holding core-plus or prime premises report an increased sustainability interest of tenants and changes in tenant demand, whereas investors primarily holding medium-quality buildings detect a very limited sustainability interest of tenants. Hence, an increase in the sustainability level of the new spaces added to the market will particularly affect the market positioning of prime or core-plus premises, while medium-quality buildings are expected to be less prone to this effect. Accordingly, the fourth hypothesis is as follows:

"Building regulations and sustainability certification systems that perpetually increase the sustainability performance level of the new spaces added to the market cause the accelerated deterioration of the existing property stock's market positioning. Due to the specific demands of their tenants, prime buildings are apparently the most affected by this effect. Consequently, such buildings may require more frequent and more substantial capital expenditure investments to meet the required quality standards and maintain a certain targeted rent level."

Fifth, as mentioned above, the increasing importance of sustainability in the real estate sector causes property companies to attach greater importance to the operations of their property portfolios. In particular, the determination of sustainability goals (especially reduction goals for resource consumption and CO_2 emissions), measurement and public disclosure of environmental performance data (including CO_2 emissions), formal coordination of responsibilities and tasks and the emerging trend of sustainability reporting are widely assumed to provide companies opportunities to improve the environmental performance of their build-

ings. The adoption of these measures in corporate practice will further penetrate the marketplace, as governments increasingly introduce emissions trading schemes, as property occupants progressively begin to use CO_2 emissions as a proxy for their environmental performance and as increasing numbers of sustainability-oriented property companies realize that a higher operational efficiency will result in greater competitive advantages in the market positioning of their buildings. In contrast, many investors regard the sustainability certification of buildings as merely a tool to demonstrate a certain performance level to prospective occupants; for such investors, sustainability certification systems are not expected to lead to higher building quality. In addition, the interviewees indicate that it is possible to certify the great majority of recently built premises because the statutory building standards are generally high. Consequently, the fifth hypothesis is as follows:

"In the long-run, the operational environmental performance indicators of energy use, CO_2 emissions, water consumption and waste recycling will represent the main criteria for assessing the sustainability performance of buildings. Accordingly, the importance of sustainability certification systems that only assess the sustainability of the building's design will probably decline in the marketplace, whereas comprehensive certification systems that assess a building's actual environmental performance and the sustainability of its management approach are expected to gain in importance."

Finally, the present dissertation indicates that a property company's portfolio composition—which varies substantially among different companies—influences the extent to which the sustainability agenda will affect the company. In particular, the building quality (via tenants that a certain building quality attracts) and the regional diversification (via environmental regulations in specific property markets) determine whether an individual sustainability aspect represents a value driver that a company must address in its sustainability approach. Accordingly, academic research that aims to either assess the sustainability performance of property companies or establish a link between property companies' financial and sustainability performances must consider the differences in property companies' property portfolios and business models (investment policies). For example, the measurement of CO_2 emissions creates value for property companies operating in markets where there are emission costs or where occupants are interested in CO_2 emissions. However, this measurement may not be worthwhile for property companies operating in markets where there are neither emission costs nor tenants interested in CO_2 emissions. In this case, from a strategic management point of view, a company's sustainability management approach would not improve by

measuring CO_2 emissions, if a company cannot reasonably expect to create shared value. For this reason, the final hypothesis in this dissertation is as follows:

"Academic research that aims to rank companies according to their sustainability management approach or to establish the link between property companies' financial and sustainability performances must take into account the differences in property companies' portfolios (particularly building quality and regional diversification). Otherwise, its results will be biased and inconclusive."

In general, the interview findings suggest that conducting research on companies' sustainability management approaches requires a detailed investigation and clear definition of various terms and concepts. For example, a green lease can assume many different forms, with the presence or absence of firm performance targets and penalties for non-achievement representing the most decisive difference. Likewise, there can be considerable variations in the sustainability criteria considered in sustainable acquisition rules and sustainability covenants in contractual agreements between property companies and service providers. For this reason, conducting interviews to examine the sustainability management approaches of property companies constitutes the most appropriate research methodology in the absence of common standards and procedures for the majority of sustainability management mechanisms. In addition, the dissertation indicates that the sustainability requirements of tenants are of utmost importance in the development of a sustainability management approach. However, there is very little knowledge, in practice and in academia, regarding the requirements and expectations of tenants with respect to the sustainability of space. Hence, future academic research should focus on this aspect. In addition, there is a great requirement for further academic research in the field of carbon finance in the real estate context. Due to the increasing prevalence of emissions trading schemes, practitioners as well as scholars should research and determine ways to incorporate emission costs in investment decision-making and to assess the consequences of emission costs on property companies and the existing property stock.

In summary, in the real estate sector, the sustainability agenda will continue to gain in importance, particularly with environmental regulations and tenant demand relentlessly propelling it. In addition, the fact that an increasing number of companies are implementing ambitious sustainability management approaches will further promote the importance and prevalence of sustainability. Although the present dissertation finds that, at the moment, mainly

high-end occupants show a marked interest in sustainability, it can be reasonably expected that the aforementioned sustainability drivers will result in a rapidly growing number of tenants being interested in the sustainability of their premises. Consequently, property companies that do not actively deal with the sustainability agenda may risk adverse consequences for their long-term success. At this juncture, companies have to abandon the idea that a sustainability management approach relates exclusively to investing in sustainable buildings and certifying buildings. In effect, a sustainable property portfolio management approach aims to improve a company's understanding of its buildings' relationship with the external environment (nature and stakeholders), minimize the impact of a company's business operations on the external environment and minimize the impacts of the sustainability agenda on a company's business operations. This idea of a sustainable property portfolio management approach involves the implementation of management operations that aim to create shared value by increasing the operating efficiency of property portfolios.

Appendix

Appendix 1: List of interviews 206

Appendix 2: Interview guide 209

Appendix 3: Existing certification schemes 215

Appendix 4: BREEAM assessment criteria 215

Appendix 5: LEED New Construction assessment criteria 216

Appendix 6: LEED Existing Building assessment criteria 218

Appendix 7: DGNB assessment criteria 219

Appendix 8: IPD Environment Code assessment criteria 220

Appendix 9: Environmental performances of listed and private property investment vehicles as reported by Kok et al. (2010) 224

Appendix 10: Real estate sector constituents of the DJSI family 225

Appendix 11: Climate Change Governance Framework (RiskMetrics) 225

Appendix 12: Carbon Risk Exposure (RiskMetrics) 226

Appendix 13: CDP Investor scheme (questionnaire) 226

Appendix 14: ISO 14001 checklist 228

Appendix 15: GRI Reporting Guidelines 232

Appendix 16: British Land's investment critical sustainability issues 233

Appendix 17: British Land's potential sustainability value issues in property acquisition 233

Appendix 1: List of interviews

Interviewee:	**Martin Ramb MRICS**
Company:	Cushman & Wakefield
Job Title:	Team Manager Engineering - Real Estate Management
Location of Interview:	Westhafenplatz 6, 60327 Frankfurt/Main
Calendar Date:	18 May 2010
Duration:	1 h 15 min

Interviewee:	**Tajo Friedemann LEED AP**
Company:	Jones Lang LaSalle
Job Title:	Consultant
Location of Interview:	Wilhelm-Leuschner-Straße 78, 60329 Frankfurt/Main
Calendar Date:	18 May 2010
Duration:	2 h

Interviewee:	**Vincent Frommel**
Company:	F&C REIT Asset Management
Job Title:	Head of Asset Management
Location of Interview:	Oberanger 34-36, 80331 München
Calendar Date:	07 June 2010
Duration:	1 h 30 min

Interviewee:	**Max Beekmann**
Company:	Pramerica Real Estate International AG
Job Title:	Chief Underwriter, Head of Sustainability
Location of Interview:	Wittelsbacherplatz 1, 80333 München
Calendar Date:	08 June 2010
Duration:	1 h

Interviewee:	**Stefan Janotta**
Company:	iii-investments
Job Title:	Head of Research & Strategy
Location of Interview:	Albrechtstraße 14, 80636 München
Calendar Date:	08 June 2010
Duration:	1 h

Interviewee:	**Dr. Philipp Naubereit**
Company:	MEAG Munich Ergo Asset Management Group
Job Title:	Consultant Special Assignments Real Estate
Location of Interview:	Oskar-von-Miller-Ring 18, 80333 München
Calendar Date:	09 June 2010
Duration:	1 h 15 min

Interviewee:	**Dr. Jürgen Schäfer**
Company:	DIC Asset AG
Job Title:	COO
Location of Interview:	Eschenheimer Landstraße 223, 60320 Frankfurt/Main
Calendar Date:	14 June 2010
Duration:	1 h

Interviewee:	**Dr. Klaus Wieland**
Company:	EPM Euro Asset Management/Bilfinger Berger
Job Title:	Head of Asset Management/ Head of Value Add
Location of Interview:	Olof-Palme-Straße 17, 60439 Frankfurt/Main
Calendar Date:	16 June 2010
Duration:	1 h 30 min

Interviewee:	**Wolfgang G. Behrendt MRICS**
Company:	Deka Immobilien Investment
Job Title:	Member of the Board of Management
Location of Interview:	Taunusanalage 1, 60329 Frankfurt/Main
Calendar Date:	17 June 2010
Duration:	2 h

Interviewee:	**Ulrich Kneisel**
Company:	SEB Asset Management
Job Title:	Head of Real Estate Technical Asset Management
Location of Interview:	Rotfeder-Ring 7, 60327 Frankfurt/Main
Calendar Date:	18 June 2010
Duration:	1 h

Interviewee:	**Rainer Kohns**
Company:	Siemens Real Estate
Job Title:	Head of Sustainability
Location of Interview:	Otto-Hahn-Ring 6, 81739 München
Calendar Date:	29 June 2010
Duration:	1 h

Interviewee:	**Georg Allendorf**
Company:	RREEF
Job Title:	Head of RREEF Germany
Location of Interview:	Eschborn/Regensburg – Phone Interview
Calendar Date:	5 November 2010
Duration:	1 h

Interviewee:	**Andreas Hoffmann**
Company:	UBS Real Estate KAG
Job Title:	Head of Asset Management Europe
Location of Interview:	Theatinerstrasse 16, 80333 München
Calendar Date:	6 December 2010
Duration:	1 h

Interviewee:	**Heike Ostriga**
Company:	Union Investment Real Estate AG
Job Title:	Head of Sustainability
Location of Interview:	Hamburg/Regensburg – Phone Interview
Calendar Date:	7 December 2010
Duration:	1 h

Appendix 2: Interview guide[784]

IRE|BS
International Real Estate Business School
Universität Regensburg

Interviewleitfaden

Für die empirische Untersuchung im Rahmen der Promotion von Helmut Schleich

Arbeitstitel: Nachhaltiges Immobilien-Portfoliomanagement – unter besonderer Berücksichtigung der energetischen Revitalisierung im Bestand

Betreuer: Prof. Dr. Stephan Bone-Winkel

Prof. Dr. Wolfgang Schäfers

Anmerkungen zum Interviewleitfaden:

- Die Durchführung und Auswertung der Interviews erfolgt rein zu wissenschaftlichen Zwecken
- Die Informationen aus den Interviews werden vertraulich behandelt und für Dritte unzugänglich aufbewahrt. Es erfolgt keine Weitergabe von Angaben oder Informationen an andere Interviewpartner

Bei Rückfragen wenden Sie sich bitte an:

Helmut Schleich

helmut.schleich@irebs.de

VIELEN DANK FÜR IHRE UNTERSTÜTZUNG

[784] The interviews were conducted in German. Likewise, the interview guide that was sent to the respondents prior to the interviews was prepared in German. To show the research process as accurate as possible, the original interview guide is given in this appendix.

Einleitung

- Kurze Vorstellung des Dissertationsvorhabens und der Forschungsmethodik
- Im Rahmen des vorliegenden Dissertationsvorhabens wird für den Begriff Nachhaltigkeit die folgende Definition des World Business Council for Sustainable Development zugrunde gelegt: „Sustainable development involves the simultaneous pursuit of economic prosperity, environmental quality and social equity. Companies aiming for sustainability need to perform not against a single, financial bottom line but against the triple bottom line."

Angaben zum Interviewpartner und seinem Unternehmen

- Bitte erläutern Sie Ihre Tätigkeiten bzw. Ihren Aufgabenbereich
- In welchen operativen Geschäftsbereichen ist Ihr Unternehmen aktiv? (Mehrfachnennungen sind möglich)

  ☐ Strategisches und operatives Management von Immobilienportfolios
  ☐ Immobilienentwicklung
  ☐ Initiierung offener oder geschlossener Fonds

- Welches Volumen an direkten Immobilienanlagen hat ihr Unternehmen aktuell? Welche Immobilientypen bilden den Schwerpunkt Ihrer Immobilieninvestments?
- Was verstehen Sie unter dem Begriff Nachhaltigkeit? Verwenden Sie in Ihrem Unternehmen eine konkrete Definition zur Eingrenzung von Nachhaltigkeit?

Strategie

- Welche Impulsgeber für Nachhaltigkeit (z.B. Gesetzgebung, verändertes Mieterverhalten, Investorenanforderungen) wirken sich auf Ihr Immobilienportfolio aus bzw. werden in Zukunft Auswirkungen auf Ihr Immobilienportfolio haben? Auf welche Art und Weise bestimmt Ihr Unternehmen die für Ihr Immobilienportfolio relevanten Aspekte?
- Ist Nachhaltigkeit ein expliziter Bestandteil der Strategie für Ihr Immobilienportfolio? Welche Nachhaltigkeitsaspekte finden aktuell Berücksichtigung bzw. sollen in Zukunft Berücksichtigung finden?
- Gibt es in Ihrem Unternehmen explizit formulierte kurz- bzw. langfristige Ziele im Bereich Nachhaltigkeit für Ihr Immobilienportfolio? Planen Sie in Zukunft die Definition entsprechender Ziele?

Bestandsanalyse & Monitoring

- Welche Kriterien (z.B. CO_2 Emissionen, Energieverbrauch, Energieausweis, Bewertung der Lage etc.) bzw. Ratingtools (LEED, BREEAM, DGNB) verwenden Sie zur Messung der Nachhaltigkeit Ihres Immobilienbestandes auf Objekt- und Portfolioebene?
- Wie erfolgt die Messung (z.B. Smart Metering, analoge Erfassung) und Auswertung der Daten? Welchen Umfang haben die erhobenen Daten (prozentuale Abdeckung des Portfolios in Prozent, Gemeinschafts- und Nutzerflächen)? Gibt es eine zentrale Datenbank zur Speicherung und Analyse der Daten?
- Erfolgt eine Untersuchung der Auswirkungen der Nachhaltigkeitsstrategie sowie von Einzelmaßnahmen auf quantitative Verbrauchsdaten und Finanzkennzahlen (z.B. Betriebskosten) auf Portfolio- und Objektebene?
- Sind in Ihrem Unternehmen Prozesse zur Kontrolle und Weiterentwicklung der Nachhaltigkeitsstrategie und der Nachhaltigkeitsleistung des Portfolios implementiert z.B. internes Reporting und Fortschrittsberichte?

Portfoliomanagement-Infrastruktur

- Wie wird das Thema Nachhaltigkeit organisatorisch in Ihrem Unternehmen integriert? Ist die leistungsabhängige Vergütungskomponente einzelner Mitarbeiter an die Erreichung von Nachhaltigkeitszielen in Ihrem Immobilienportfolio geknüpft?
- Gibt es in Ihrem Unternehmen Maßnahmen zur Weiterbildung von Asset- und Property Manager im Bereich Nachhaltigkeit um ein optimales Leistungsniveau in Ihrem Gebäudebestand sicherzustellen?
- Ist Ihr Unternehmen in Verbänden oder Ausschüssen engagiert, welche sich mit der Umsetzung von Nachhaltigkeitsaspekten in der Immobilienwirtschaft auseinandersetzen?

Portfolioplanung

- Hat Ihr Unternehmen einen Nachhaltigkeits-Mindeststandard für Ihr Immobilienportfolio und Einzelimmobilien definiert? Welche Kriterien bzw. Ratingtools werden hierfür herangezogen? Für welchen Anteil Ihres Immobilienportfolios gilt dieser Standard?
- Auf welche Art und Weise berücksichtigt Ihr Unternehmen das Thema Nachhaltigkeit im Akquisitionsprozess von Immobilieninvestments? Welche Kriterien (z.B. Energieeffizienz, CO_2 Emissionen etc.) und Ratingtools (z.B. LEED, BREEAM, DGNB) werden herangezogen und welche Mindestanforderungen bei Neuinvestitionen sind hierfür vorgegeben?

- Wurde die Berücksichtigung von Nachhaltigkeitsaspekten im Akquisitionsprozess formal festgehalten?
- Inwieweit werden Nachhaltigkeitsaspekte in den Entscheidungsprozess zum Desinvestment von Immobilien einbezogen?
- Welche Nachhaltigkeitsaspekte werden explizit bei Immobilienentwicklungsprojekten berücksichtigt? Wie werden diese Aspekte berücksichtigt? Welche Kriterien (z.B. Energieeffizienz, CO_2 Emissionen) und Ratings (z.B. LEED, BREEAM) werden für die Bewertung der Nachhaltigkeit von Immobilienentwicklungsprojekten eingesetzt? Welches sind die bei Immobilienentwicklungen angestrebten Mindest-Nachhaltigkeitsstandards?
- Inwieweit werden bei Projektentwicklungen „grüne" Gebäudetechnologien (z.B. Photovoltaik) geprüft und integriert?
- Werden bei Projektentwicklungsmaßnahmen externe Berater zur Optimierung im Bereich Nachhaltigkeit eingebunden?
- Verfügt Ihr Unternehmen über formale Richtlinien und Leitfäden für die Integration von Nachhaltigkeitsaspekten in Immobilienentwicklungsprojekte?

Asset & Property Managementstrategie

Strategien und Maßnahmen zur Erreichung eines nachhaltigen Mieterverhaltens

- Verfügt Ihr Unternehmen über Initiativen zur Verbesserung der Nachhaltigkeit Ihres Immobilienportfolios welche auf einer Einbeziehung der Mieter aufbauen und eine Anpassung des Mieterverhaltens anstreben? Welche Maßnahmen (z.B. „Green Leases", „Tenant Sustainability Guides", Gründung von Nachhaltigkeits-Arbeitsgruppen mit Mietern, Mieterzufriedenheitsumfragen) wurden ergriffen bzw. planen Sie zu ergreifen?
- Wie schätzen Sie den Nutzen von „Green Leases" ein? Was sind aus Ihrer Sicht mögliche Bestandteile eines „Green Leases"?
- Stellt Ihr Unternehmen seinen Mietern formale Leitfäden zur Berücksichtigung von Nachhaltigkeitsaspekten in der Nutzung der Immobilien zur Verfügung?

Strategien und Maßnahmen zur physischen Aufwertung des Portfoliobestands

- Ergreift Ihr Unternehmen Maßnahmen um Ihr Portfolio systematisch im Bereich Nachhaltigkeit aufzuwerten? Welche Maßnahmen wurden bzw. werden in Zukunft ergriffen? Wie erfolgt die Identifizierung geeigneter Maßnahmen?
- Verfügt Ihr Unternehmen, auf Objektebene, über ökologische Maßnahmepläne welche beispielsweise der Analyse und Planung von Investitionen zur Aufwertung einzelner Immobilien im Bereich Nachhaltigkeit dienen? Was sind die relevanten Bestandteile ei-

nes ökologischen Maßnahmeplans? Für welchen Anteil Ihres Immobilienportfolios bestehen solche Pläne?

- Inwieweit nutzt Ihr Unternehmen „grüne“ Gebäudetechnologien (z.B. Photovoltaik) zur Aufwertung des Gebäudebestandes?
- Werden umweltspezifische Kriterien bei der Renovierung von Immobilien und dem Ersatz technischer Gebäudeanalagen berücksichtigt? Werden Nachhaltigkeitsaspekte im Instandhaltungsmanagement explizit berücksichtigt? Welche Kriterien werden berücksichtigt?
- Wie bewerten Sie Investitionen zur Verbesserung der Nachhaltigkeit Ihres Immobilienbestandes und auf welchem Wege ermitteln Sie Ihre Vorteilhaftigkeit?
- Verfügt Ihr Unternehmen über Strategien zum Ausgleich von CO_2 Emissionen um hierdurch eine Benchmark für Investitionen zur CO_2 Minimierung zu etablieren?

Strategien und Maßnahmen für ein nachhaltiges Property Management

- Sind in Ihrem Unternehmen Maßnahmen zur expliziten Einbeziehung von Nachhaltigkeitsaspekten in das Property Management vorhanden? Um welche Maßnahmen handelt es sich hierbei?
- Werden in Ihrem Unternehmen regelmäßig Untersuchungen der Gebäude-Energieeffizienz durchgeführt, um hierdurch ein optimales Leistungsniveau aller technischen Gebäudeanlagen sicherzustellen?
- Nutzt Ihr Unternehmen neue Dienstleistungskonzepte im Bereich Nachhaltigkeit wie z.B. Wärme-Contracting?
- Verfügt Ihr Unternehmen über formale Richtlinien welche Vorgaben für die Berücksichtigung von Nachhaltigkeitsaspekten im Property Management definieren?

Strategien und Maßnahmen zur Berücksichtigung von Nachhaltigkeit bei der Beschaffung von Gütern- und Dienstleistungen

- Berücksichtigt Ihr Unternehmen Nachhaltigkeitsaspekte bei der Auswahl von Gütern und Dienstleistern?
- Wie können Nachhaltigkeitsaspekte in die Auswahl und das Monitoring von Dienstleistern integriert werden?
- Welche Kriterien eignen sich zur Beurteilung der Leistungen von Dienstleistern im Bereich Nachhaltigkeit?
- Welcher Anteil Ihres Energieverbrauchs stammt aus erneuerbaren Energien?
- Verfügt Ihr Unternehmen über formale Richtlinien zur Einbeziehung von Nachhaltigkeitsaspekten in die Auswahl von Dienstleistern?

Risikomanagement

- Welche Rolle spielt das Thema Nachhaltigkeit im Risikomanagement Ihres Immobilienportfolios? Wie kann Nachhaltigkeit im Risikomanagement verankert werden? Was sind relevante Indikatoren und Kriterien zur Identifizierung der relevanten Risiken?
- Welche finanziellen Auswirkungen des Themas Nachhaltigkeit auf Ihr Immobilienportfolio erwarten Sie?

Externes Reporting von Nachhaltigkeit

- Plant Ihr Unternehmen in Zukunft über Maßnahmen und Daten im Bereich Nachhaltigkeit öffentlich zu berichten? Wie soll die öffentliche Kommunikation (z.B. Jahresbericht, CSR Reports, Website) erfolgen?
- Beabsichtigen Sie die Verwendung anerkannter Standards für die externe Nachhaltigkeits-Berichterstattung (z.B. Global Reporting Initiative)?
- Streben Sie eine Überprüfung öffentlich kommunizierter Berichte und Daten von unabhängigen Stellen an?

Ergänzende Anmerkungen und Fragen

- Weitere Ansprechpartner in Deutschland?
- Thematische Anregungen zum Fragebogen?

Appendix 3: Existing certification schemes

Continent	Labeling	Country
Americas	LEED	USA
	Energy Star	USA
	Green Globes	USA
	LEED Canada	Canada
	LEED Mexico	Mexico
	LEED Brazil	Brazil
Europe	Green Building	Europe
	DGNB	Germany
	BREEAM	U.K.
	HQE	France
	Minergie	Swiss
Asia	LEED Emirates	UAE
	LEED India	India
	Green Mark	Singapore
	HK-BEAM	Hong Kong
	CASBEE	Japan
Australia	Green Star	Australia
	Nabers	Australia
	Green Star NZ	New Zealand

Source: Reed, R. et al. (2009), p. 10.

Appendix 4: BREEAM assessment criteria

	Management Section	Credits
Man 1	Commissioning	1-2
Man 2	Considerate Constructors	1-2
Man 3	Construction Site Impacts	1-4
Man 4	Building User Guide	1
Man 8	Security	1
	Health & Wellbeing Section	
Hea 1	Daylighting	1
Hea 2	View Out	1
Hea 3	Glare Control	1
Hea 4	High Frequency Lighting	1
Hea 5	Internal and External Lighting Levels	1
Hea 6	Lighting Zones & Controls	1
Hea 7	Potential for Natural Ventilation	1
Hea 8	Indoor Air Quality	1
Hea 9	Volatile Organic Compounds	1
Hea 10	Thermal Comfort	1
Hea 11	Thermal Zoning	1
Hea 12	Microbial Contamination	1
Hea 13	Acoustic Performance	1
	Energy Section	
Ene 1	Reduction of CO_2 Emissions	1-15
Ene 2	Sub-Metering of Substantial Energy Uses	1
Ene 3	Sub-Metering of High Energy Load and Tenancy Areas	1
Ene 4	External Lighting	1
Ene 5	Low or Zero Carbon Technologies	1-3
Ene 8	Lifts	1-2
Ene 9	Escalators & Travelling Walkways	1
	Transport Section	

Tra 1	Provision of Public Transport	1-3
Tra 1	Proximity to Amenities	1
Tra 3	Cyclist Facilities	1-2
Tra 4	Pedestrian and Cyclist Safety	1
Tra5	Travel Plan	1
Tra 6	Maximum Car Parking Capacity	1-2
	Water Section	
Wat 1	Water Consumption	1-3
Wat 2	Water Meter	1
Wat 3	Major Leak Detection	1
Wat 4	Sanitary Supply Shut-Off	1
	Materials Section	
Mat 1	Materials Specification (Major Building Elements)	1-4
Mat 2	Hard Landscaping and Boundary Protection	1
Mat 3	Reuse of Building Façade	1
Mat 4	Reuse of Building Structure	1
Mat 5	Responsible Sourcing of Materials	1-3
Mat 6	Insulation	1-2
Mat 7	Designing for Robustness	1
	Waste Section	
Wst 1	Construction Site Waste Management	1-4
Wst 2	Recycled Aggregates	1
Wst 3	Recyclable Waste Storage	1
Wst 6	Floor Finishes	1
	Land Use & Ecology Section	
LE 1	Reuse of Land	1
LE 2	Contaminated Land	1
LE 3	Ecological Value of Site AND Protection of Ecological Features	1
LE 4	Mitigating Ecological Impact	1-2
LE 5	Enhancing Site Ecology	1-3
LE 6	Long Term Impact on Biodiversity	1-2
	Pollution Section	
Pol 1	Refrigerant GWP: Building Services	1
Pol 2	Preventing Refrigerant Leaks	1-2
Pol 4	NO_X Emissions from Heating Source	1-3
Pol 5	Flood Risk	1-4
Pol 6	Minimizing Watercourse Pollution	1
Pol 7	Reduction of Night Time Light Pollution	1
Pol 8	Noise Attenaution	1

Source: Building Research Establishment (2008b), pp. 34 et seqq.

Appendix 5: LEED New Construction assessment criteria

	Sustainable Sites: 26 Possible Points	**Credits**
Prereq. 1	Construction Activity Pollution Prevention	Required
SS 1	Site Selection	1
SS 2	Development Density & Community Connectivity	5
SS 3	Brownfield Redevelopment	1
SS 4.1	Alternative Transportation: Public Transportation Access	6
SS 4.2	Alternative Transportation: Bicycle Storage & Changing Rooms	1
SS 4.3	Alternative Transportation: Low Emitting & Fuel Efficient Vehicles	3
SS 4.4	Alternative Transportation: Parking Capacity	2
SS 5.1	Site Development: Protect or Restore Habitat	1
SS 5.2	Site Development: Maximize Open Space	1

SS 6.1	Stormwater Design: Quantity Control	1
SS 6.2	Stormwater Design: Quality Control	1
SS 7.1	Heat Island Effect: Non-Roof	1
SS 7.2	Heat Island Effect: Roof	1
SS 8	Light Pollution Reduction	1
	Water Efficiency: 10 Possible Points	
Prereq. 1	Water Use Reduction	Required
WE 1	Water Efficient Landscaping:	2-4
WE 2	Innovative Wastewater Technologies	2
WE 3	Water Use Reduction	2-4
	Energy & Atmosphere: 35 Possible Points	
Prereq. 1	Fundamental Commissioning of Building Energy Systems	Required
Prereq. 2	Minimum Energy Performance	Required
Prereq. 3	Fundamental Refrigerant Management	Required
EA 1	Optimize Energy Performance	1-19
EA 2	On-Site Renewable Energy	1-7
EA 3	Enhanced Commissioning	2
EA 4	Enhanced Refrigerant Management	2
EA 5	Measurement & Verification	3
EA 6	Green Power	2
	Materials & Resources: 14 Possible Points	
Prereq. 1	Storage & Collection of Recyclables	Required
MR 1.1	Building Reuse: Maintain Existing Walls, Floors & Roof	1-3
MR 1.2	Building Reuse: Maintain Existing Interior Non-Structural Elements	1
MR 2	Construction Waste Management	1-2
MR 3	Materials Reuse	1-2
MR 4	Recycled Content	1-2
MR 5	Regional Materials	1-2
MR 6	Rapidly Renewable Materials	1
MR 7	Certified Wood	1
	Indoor Environmental Quality: 15 Possible Points	
Prereq. 1	Minimum Indoor Air Quality (IAO) Performance	Required
Prereq. 2	Environmental Tobacco Smoke (ETS) Control	Required
EQ 1	Outdoor Air Delivery Monitoring	1
EQ 2	Increased Ventilation	1
EQ 3.1	Construction IAQ Management Plan: During Construction	1
EQ 3.2	Construction IAQ Management Plan: Before Occupancy	1
EQ 4.1	Low-Emitting Materials: Adhesives & Sealants	1
EQ 4.2	Low-Emitting Materials: Paints & Coatings	1
EQ 4.3	Low-Emitting Materials: Flooring Systems	1
EQ 4.4	Low Emitting Materials: Composite Wood & Agrifiber Products	1
EQ 5	Indoor Chemical & Pollutant Source Control	1
EQ 6.1	Controllability of Systems: Lighting	1
EQ 6.2	Controllability of Systems: Thermal Comfort	1
EQ 7.1	Thermal Comfort: Design	1
EQ 7.2	Thermal Comfort: Verification	1
EQ 8.1	Daylight & Views: Daylight	1
EQ 8.2	Daylight & Views: Views	1
	Innovation & Design Process: 6 Possible Points	
ID 1.1 – 1.4	Innovation in Design	1-5
ID 2	LEED Accredited Professional	1
	Regional Priority	
RP 1	Regional Priority	1-4

Source: U.S. Green Building Council (2009), pp. 1 et seqq.

Appendix 6: LEED Existing Building assessment criteria

	Sustainable Sites: 26 Possible Points	**Credits**
SS 1	LEED Certified Design and Construction	4
SS 2	Building Exterior and Hardscape Management Plan	1
SS 3	Integrated Pest Management, Erosion Control and Landscape Management Plan	1
SS 4	Alternative Commuting Transportation	3-15
SS 5	Site Development: Protect or Restore Habitat	1
SS 6	Stormwater Quantity Control	1
SS 7.1	Heat Island Effect: Non-Roof	1
SS 7.2	Heat Island Effect: Roof	1
SS 8	Light Pollution Reduction	1
	Water Efficiency: 14 Possible Points	
Prereq. 1	Minimum Indoor Plumbing Fixture and Fitting Efficiency	Required
WE 1	Water Performance Measurement	1-2
WE 2	Additional Indoor Plumbing Fixture and Fitting Efficiency	1-5
WE 3	Water Efficient Landscaping	1-5
WE 4	Cooling Tower Water Management – Chemical Management	1
WE 5	Cooling Tower Water Management – Nonpotable Water Source Use	1
	Energy & Atmosphere: 35 Possible Points	
Prereq. 1	Energy Efficiency Best Management Practices – Planning, Documentation, and Opportunity Assessment	Required
Prereq. 2	Minimum Energy Efficiency Performance	Required
Prereq. 3	Fundamental Refrigerant Management	Required
EA 1	Optimize Energy Efficiency Performance	1-18
EA 2.1	Existing Building Commissioning – Investigation and Analysis	2
EA 2.2	Existing Building Commissioning – Implementation	2
EA 2.3	Existing Building Commissioning – Ongoing Commissioning	2
EA 3.1	Performance Measurement – Building Automation System	1
EA 3.2	Performance Measurement – System Level Metering	1-2
EA 4	On-Site and Off-Site Renewable Energy	1-6
EA 5	Enhanced Refrigerant Management	1
EA 6	Emissions Reduction Reporting	1
	Materials & Resources: 10 Possible Points	
Prereq. 1	Sustainable Purchasing Policy	Required
Prereq. 2	Solid Waste Management Policy	Required
MR 1	Sustainable Purchasing – Ongoing Consumables	1
MR 2.1	Sustainable Purchasing –Electric-Powered Equipment	1
MR 2.2	Sustainable Purchasing –Furniture	1
MR 3	Sustainable Purchasing –Facility Alterations and Additions	1
MR 4	Sustainable Purchasing – Reduced Mercury in Lamps	1
MR 5	Sustainable Purchasing – Food	1
MR 6	Solid Waste Management – Waste Stream Audits	1
MR 7	Solid Waste Management – Ongoing Consumables	1
MR 8	Solid Waste Management – Durable Goods	1
MR 9	Solid Waste Management – Facility Alterations and Additions	1
	Indoor Environmental Quality: 15 Possible Points	
Prereq. 1	Minimum Indoor Air Quality (IAO) Performance	Required
Prereq. 2	Environmental Tobacco Smoke (ETS) Control	Required
Prereq. 2	Green Cleaning Policy	Required
EQ 1.1	Indoor Air Quality Best Management Practices - Indoor Air Quality Management Program	1
EQ 1.2	Indoor Air Quality Best Management Practices - Outdoor Air Delivery Monitoring	1
EQ 1.3	Indoor Air Quality Best Management Practices - Increased Ventilation	1
EQ 1.4	Indoor Air Quality Best Management Practices – Reduce Particulates in Air Distribution	1
EQ 1.5	Indoor Air Quality Best Management Practices – Indoor Air Quality Management for Facility Alterations and Additions	1

EQ 2.1	Occupant Comfort – Occupant Survey	1
EQ 2.2	Controllability of Systems: Lighting	1
EQ 2.3	Occupant Comfort – Thermal Comfort Monitoring	1
EQ 2.4	Daylight and Views	1
EQ 3.1	Green Cleaning – High Performance Cleaning Program	1
EQ 3.2	Green Cleaning – Custodial Effectiveness Assessment	1
EQ 3.3	Green Cleaning – Purchase of Sustainable Cleaning Products and Materials	1
EQ 3.4	Green Cleaning – Sustainable Cleaning Equipment	1
EQ 3.5	Green Cleaning – Indoor Chemical and Pollutant Source Control	1
EQ 3.6	Green Cleaning – Indoor Integrated Pest Management	1
	Innovation in Operations: 6 Possible Points	
IO 1	Innovation in Operations	1-4
IO 2	LEED Accredited Professional	1
IO 3	Documenting Sustainable Building Cost Impacts	1
	Regional Priority	
RP 1	Regional Priority	1-4

Source: U.S. Green Building Council (2010a), pp. V-VII.

Appendix 7: DGNB assessment criteria

Main Criteria	Criteria	Criteria Points		Weighting Factor	Adaptation Factor	Weighted Points		Performance Index	Group Points		Group Performance Index	Group Weight	Total Performance Index
		Achieved	Maximum			Achieved	Maximum		Achieved	Maximum			
Ecological Quality	Global warming potential		10	3	1		30			200		22,5	
	Ozone depletion potential		10	1	1		10						
	Photochemical ozone creation potential		10	1	1		10						
	Acidification potential		10	1	1		10						
	Eutrophication potential		10	1	1		10						
	Risks to the local environment		10	3	1		30						
	Sustainable use of resources		10	1	1		10						
	Microclimate				0								
	Nonrenewable primary energy demand		10	3	1		30						
	Total primary energy demand and share of renewable primary energy		10	2	1		20						
	Drinking water demand and volume of waste water		10	2	1		20						
	Space demand		10	2	1		20						
Economic Quality	Building lifecycle costs		10	3	1		30			50		22,5	
	Suitability for conversations		10	2	1		20						
Sociocultural and Functional Quality	Thermal comfort in the winter		10	2	1		20			280		22,5	
	Thermal comfort in the summer		10	3	1		30						
	Interior hygiene		10	3	1		30						
	Acoustic comfort		10	1	1		10						
	Visual comfort		10	3	1		30						
	User control possibilities		10	2	1		20						
	Quality of outdoor space		10	1	1		10						
	Safety and risk of hazardous incidents		10	1	1		10						
	Handicapped accessibility		10	2	1		20						

	Space efficiency		10	1	1		10						
	Suitability for conversions		10	2	1		20						
	Public access		10	2	1		20						
	Bicycling convenience		10	1	1		10						
	Social integration				0								
	Assurance of design and urban development quality in a competition		10	3	1		30						
	Percent for art		10	1	1		10						
	Occupancy profile attributes				0								
Technical Quality	Fire prevention		10	2	1		20			100		22,5	
	Noise, electromagnetic fields, etc.		10	2	1		20						
	Quality of building envelope's heat and humidity technology		10	2	1		20						
	Ease of cleaning and maintenance		10	2	1		20						
	Ease of dismantling and recycling		10	2	1		20						
Process Quality	Quality of project preparation		10	3	1		30			230		10	
	Integral planning		10	3	1		30						
	Optimization and complexity of planning method		10	3	1		30						
	Evidence of sustainable aspects in call for and awarding of tenders		10	2	1		20						
	Creation of conditions for optimal use and management		10	2	1		20						
	Construction site / Construction process		10	2	1		20						
	Quality of companies involved / prequalification		10	2	1		20						
	Quality assurance for construction process		10	3	1		30						
	Systematic initiation of operation		10	3	1		30						

Source: Deutsche Gesellschaft für Nachhaltiges Bauen e.V. (2009), p. 11.

The DGNB sustainability assessment considers a building's location in a separate rating. Consequently, a building's location does not impact on the final assessment result

Site Quality	Risks in micro-environment		10	2	1		20			130			
	Relationships in the micro-environment		10	2	1		20						
	Image and state of site and neighborhood		10	2	1		20						
	Access to transportation		10	3	1		30						
	Proximity to use-specific facilities		10	2	1		20						
	Connections to public services		10	2	1		20						

Source: Deutsche Gesellschaft für Nachhaltiges Bauen e.V. (2009), p. 11.

Appendix 8: IPD Environment Code assessment criteria

Core Measures	
Imported Energy	
EA1 Electricity	The total annual imported electricity (kWh) used to provide electrical services to a building; Includes: the sum of EA1a, EA1b and EA1c
EA1a Mains Electricity	The annual electricity (kWh), as metered, to a building supplied by the mains supply. Includes: all mains electricity supplied to the building Excludes: electricity provided by on-site renewable generation, communal electricity, owned off-site facility electricity
EA1b Communal Electricity	The annual electricity (kWh), as metered, to a building supplied by communal power sources. Includes: all electricity supplied by communal schemes, for example a community Combined Heat and Power scheme or community wind turbine Excludes: all mains supplied electricity (EA1a), owned off-site facility generated electricity (EA1c)
EA1c Owned Off-	The annual electricity (kWh), as metered, to a building supplied by the organization's, or

Site Facility	building owner's, own off-site electricity supply. Includes: all electricity supplied to the building as a result of direct investment in an off-site supply by the building owner or occupier. For example, off site wind turbines. Excludes: all mains supplied electricity (EA1a), communal electricity (EA1b)
EA2 Fossil Fuels	The annual energy equivalent (kWh) to a building supplied by fossil fuels (as detailed in EA2a to EA2e below) Where possible, provide data on the specific fuel type set out below. See Appendix 4 for advice on converting fuel use from mass or volume to kilowatt hours. Includes: the sum total of EA2a to EA2e below Excludes: other imported energy sources listed under categories EA1, EA3 and EA4
EA2a Natural Gas	The annual natural gas (kWh equivalent), as metered, used to provide space and water heating and associated functions to a building. Excludes: liquefied petroleum gas (EA2c), biogases (EA3a)
EA2b Oil	The annual oil use (kWh equivalent), as metered, used to provide space and water heating and associated functions to a building.
EA2c LPG	The annual energy equivalent (kWh) of Liquefied Petroleum Gas (LPG) use. Excludes: natural gas
EA2d Solid Fossil Fuels	The annual energy equivalent (kWh) of solid fossil fuel use. Includes: coal, anthracite, smokeless fuels
EA2e Other Fossil-derived and Non-Renewable Fuels	The annual energy equivalent (kWh) of other fossil-derived and non-renewable fuel use. Includes: other fuel uses not covered in EA2a to EA2d above, e.g. coal gas, bitumen.
EA3 Renewable Fuels	The annual energy equivalent (kWh) of imported renewable fuels. Includes: the sum total of EA3a, EA3b and EA3c below Excludes: other imported fuels listed under categories EA1, EA2 and EA4
EA3a Gases	The annual energy equivalent (kWh) of renewable gases. Includes: biogas, 'landfill gas' methane Note: Biogas is a mixture of gases, principally methane and carbon dioxide, produced from the anaerobic breakdown of organic material, e.g. from landfill or in sewage digesters. Methane is a potent greenhouse gas, 21 times more so than carbon dioxide over 100 years; and even more potent in the short term
EA3b Liquids	The annual energy equivalent (kWh) of renewable liquid fuels. Includes: biodiesel, ethanol
EA3c Solids	The annual energy equivalent (kWh) of biomass used. Includes: solid 'biofuels' derived from biomass (i.e. organic material made from plants and animals). Wood is commonly used Excludes: renewable energy resources in gaseous or liquid form such as biogas, landfill gas, biodiesel
EA4 Communal Non-Electrical Energy	The annual non-electrical energy equivalent (kWh) supplied to a building by communal sources. If possible, provide specific data on the type of communal energy imported, as set out in EA4a and EA4b below. Includes: the sum total of EA4a and EA4b Excludes: other imported fuels listed under categories EA1, EA2 and EA3
EA4a Communal Heating	The annual energy equivalent (kWh) to a building supplied by communal heating sources. Includes: hot water or steam from district schemes, for example a community Combined Heat and Power scheme
EA4b Communal Cooling	The annual energy equivalent (kWh) to a building supplied by communal cooling sources. Includes: chilled water from district schemes
On-Site Renewable Energy (not requiring imports)	
EA5 On-Site Renewable Electricity Generation	The annual electrical energy (kWh) generated on-site through renewable sources. Includes: for example, photovoltaic systems, wind turbines, hydro turbines
EA6 On-Site Renewable Combustion Fuels	The annual energy equivalent (kWh) generated on-site through renewable combustion fuels. Includes: for example, on-site harvested biomass
EA7 On-Site Renewable Heating and Cooling	The annual thermal energy equivalent (kWh) generated on-site through renewable sources. Includes: the sum total of EA7a and EA7b below
EA7a Renewable Heating	The annual heating energy equivalent (kWh) generated on-site through renewable sources. Includes: for example, solar energy, direct geothermal heating
EA7b Renewable Cooling	The annual cooling energy equivalent (kWh) generated on-site through renewable sources. Includes: for example, groundwater cooling
Carbon Emissions	
EA8 CO2 Equivalent	The annual CO2 equivalent emissions based on the sum of relevant items under the headings EA1, EA2, EA3* and EA4 above.
Measures for Compensating and Offsetting Carbon Emissions	

EA9 Supplied "Zero Carbon" Electricity	The annual imported electricity (kWh) that is sourced through a verified renewable 'zero carbon' supply and used in the building. (See overleaf for details of green energy tariffs.) Includes: supplied electricity that has been verified* as having a zero carbon loading. These can include on-shore and off-shore wind, hydro-electric, tidal, solar, photovoltaic, geothermal Excludes: all fossil fuel energy generation, all on-site renewable energy generation, communal electricity heating and cooling, green energy 'fund' tariffs and 'carbon offset' tariffs (as EA10 below)
EA10 Other "Renewable Energy" Tariff Use	The annual imported electricity (kWh) that is sourced using 'renewable energy tariffs' other than EA9 above. (See overleaf for further details of such tariffs). Includes: 'renewable Energy Fund' tariffs (energy tariffs where the supplier invests a premium into renewable energy or related projects) and 'Carbon Offset' tariffs (energy tariffs where suppliers offer to offset the CO2 emitted by the gas and electricity supplied) Excludes: verified* zero carbon supplied energy
Sub-metered Energy Uses	
EA11 Total Sub-Metered Energy Use	The total annual sub-metered energy used (kWh) for building uses or areas. Includes: the sum total of EA11a, EA11b and EA11c below
EA11a Electrical	The annual sub-metered electricity used (kWh) for building uses or areas. Includes: sub-metered electricity supplied to a localized area or piece of equipment. For example, an item of process equipment, or an IT Server Room
EA11b Thermal	The annual sub-metered heat use (kWh) for building uses or areas. Includes: sub-metered hot or chilled water supplied to a localized area or piece of equipment. For example, hot water to a catering kitchen
EA11c Fuel	The annual sub-metered fuel use (kWh) for building uses or areas. Includes: sub-metered combustion fuel supplied to a localized area or piece of equipment. For example, natural gas supplied to a catering kitchen
Core Water Data	
EB1 Mains Water Consumption	The annual volume (m3) of mains supplied water used in a building. Includes: mains supplied water for general use, for example, catering, washrooms, cleaning Excludes: bottled drinking water, on-site extracted water, on-site harvested rain and snow water, recycled 'grey water', water used for production processes (for example heavy industry)
EB2 Water Extracted On-Site	The annual volume (m3) of water extracted directly on site and used in a building. Includes: water extracted on-site through boreholes or water courses (for example rivers and streams) Excludes: all mains-supplied water, harvested rain and snow water
EB3 Use of Harvested Rain and Snow Water	The annual volume (m3) of collected rain and snow water and used in a building. Snow Water Includes: all rain and snow water that is collected (after falling on the building) and used on site (for example watering grounds or flushing toilets)
EB4 Use of Recycled Water	The annual volume (m3) of recycled 'greywater' used in a building. Includes: waste water produced from baths, sinks, showers, clothes washers, dishwashers and lavatories. This can be recycled and reused if an appropriate system is installed
Core Waste Data	
EC1 Total Non-Recycled Waste	The annual mass (tonnes) of waste arising from a building sent to landfill and incineration. If possible, please provide specific data on methods of waste disposal as set out in EC1a, EC1b and EC1c below. Includes: any waste produced on site which is not reused or recycled. Mass weight (tonnes) is the preferred measure but, where mass is not available, it is acceptable to use approximations by volume (see Appendix 4 for advice on converting waste volume data to mass equivalent) Excludes: all recycled waste and composted waste, construction waste, waste returned to producers (e.g. under EU WEEE Regulations or other national or international regulations)
EC1a General Waste Sent to Landfill	The annual mass (tonnes) of waste arising from a building sent to landfill (landfill is defined as a waste disposal site for the deposit of the waste onto or into land). Includes: internal waste disposal sites (i.e. a landfill where a producer of waste is carrying out its own waste disposal at the place of production) Excludes: facilities where waste is unloaded in order to permit its preparation for further transport for recovery, treatment or disposal elsewhere; storage of waste prior to recovery or treatment (for a period less that three years as a general rule), or storage of waste prior to disposal (for a period less than one year)
EC1b Incinerated General Waste with Energy Recovery	The annual mass (tonnes) of waste arisings from a building sent for incineration (with energy recovery). Energy Recovery from waste describes the process in which energy (in the form of heat) is recovered from the incineration of waste, and used to generate electricity which is then fed back into the national electricity 'grid' or network, or to provide both

	electricity and heat (combined heat and power) to nearby communities or other uses. This is an option for the disposal of high calorific-value wastes such as tyres and plastics.
EC1c Incinerated General Waste with No Energy Recovery	The annual mass (tonnes) of waste arisings from a building sent for incineration (with no energy recovery). This is often the most suitable option for hazardous chemicals and clinical waste. For example, the EU Landfill Directive bans certain wastes from being sent to landfill (liquid waste, explosive, corrosive or flammable waste).
EC2 Recycled Waste	The annual mass (tonnes) of waste arisings from a building that are recycled. Includes: many wastes can be recycled, for example paper, cardboard, glass, metal, plastics, batteries, waste electronic equipment, laser printer cartridges, fluorescent tubes, wood (for example, pallets) Excludes: general waste for incineration or landfill, composted waste, waste returned to producers (e.g. under EU WEEE Regulations or other national or international regulations)
EC3 Composted Waste	The annual mass (tonnes) of waste arisings from a building that are composted. Includes: biodegradable waste

Qualitative Measures - Environmental "Health Check"

General

1. Is there a named individual with specific responsibility for overall environmental management for this property? Yes – score 5; No score 0
2. Is there a formal Environmental Management System such as ISO14001 in place that covers activities in this property? Yes – 5; No - 0

Energy

3. Has a target for boiler combustion efficiencies been set for servicing operators to meet? Yes – 3; No - 0
4. Do time settings for heating/cooling controls match occupancy hours? Yes – 3; No - 0
5. To what extent does the building have electricity metering? Pick one of the following: None – 0; Building Level – 1; Sub-building level e.g. floor level - 3
6. To what extent does the building have gas metering? Pick one of the following: None – 0; Building Level – 1; Sub-building level e.g. floor level - 3
7. Are light switches and controls labeled to aid manual control? Yes – 2; No - 0
8. Are light fittings and diffusers cleaned at least annually? Yes – 2; No - 0
9. Are light switches wired in parallel to windows to enable lights close to the window to be switched off, while those in the centre may remain on? Yes – 2;No - 0
10. Is lighting controlled by time-setting controls, for example to match occupancy hours? Yes – 2; No - 0
11. Are lights fitted with motion sensors to detect occupancy e.g. in toilet areas? Yes – 2; No - 0
12. Is photoelectric switching and dimming in place? Yes – 2; No - 0
13. Are local temperature controls available within the building? Yes – 2; No - 0

Water

14. Does the building have the following water efficient fittings?
    - Toilets (dual flush, low cistern capacity, waterless urinals etc) Yes - 3; No – 0;
    - Taps (aerating or other low flow features) Yes – 3; No – 0;
    - Showers (for example, low flow shower head) Yes – 2; No – 0;
15. Does the building have an operable leak detection system? Yes – 3; No - 0
16. To what extent does the building have water metering? Pick one of the following: None – 0; Building Level – 1; Sub-building level e.g. floor level - 3
17. Are regular checks (and repairs) made for dripping taps by building staff e.g. security, cleaners? Yes – 3; No - 0

Waste

18. Do you have a waste management plan for the building? No – 0; If yes, which of the following are included: Recycling – 2; Wet and dry waste bins – 2; Take back schemes e.g. for print cartridges, batteries, fluorescent light tubes – 2; Environmentally sourced consumables e.g. paper – 2; Re-use of consumables and equipment e.g. paper, IT equipment – 2;
19. Which of the following is true?
    - There are enough well placed bins for segregating white paper – 2;
    - There are also bins for segregating at least one of these waste types: plastic, glass, metals – 2;
    - Information on the amounts of each type of waste taken off-site is regularly communicated to occupants – 2;
20. Is there a drive to reduce the number of waste bins per person? Yes – 2; No - 0
21. Is there a policy in place to use recycled or sustainably sourced products? Yes – 2; No - 0

Transport and Travel

22. Is there a 'Green Travel Plan' in place at this property to encourage more sustainable forms of transport to work? Yes - 3; No – 0;
23. Is the building located within 1 km of a commuter rail or subway station? Yes – 2; No – 0; If not, are building occupants provided with a shuttle link e.g. a bus service that supplies transportation between the building and local public transport? Yes – 1;No - 0
24. Does the building have its own cycle parking facilities? Yes – 1; No - 0
25. Are shower and changing facilities available for staff? Yes – 1; No - 0
26. Are 'food miles' taken into account in procurement of catering/vending facilities? Yes – 1; No – 0

Equipment and Appliances

27. How frequently are checks made for refrigerant leaks within the building? 6 monthly or less – 2; Annually – 1; 1+ years – 0; Don't know - 0
28. Does the building make use of alternative 'greener' refrigerants to HCFCs (e.g. ammonia, propane, carbon dioxide, HFC32)? Yes – 2; No - 0
29. Is there a plan in place to phase out the existing HCFC gases? Yes – 1; No - 0
30. Has a refrigerant gas leak detection system been installed within this property? Yes – 1; No - 0
31. Do you monitor and record NOx emissions in relation to the building? Yes – 1; No - 0
32. Is consideration made of light pollution and possible impact upon local residencies, neighboring buildings etc? Yes – 1; No – 0

Health and Well-Being

33. Are there openable windows on all floors of the building? Yes – 2; No - 0
34. How frequently are maintenance checks made to the air intake system? Annually – 2; 1-3 Years – 1; 3+ Years - 0
35. Is there on-site water storage in place at this building? No – 1; If yes: Is the volume stored less than one working day's average consumption? - 0.5; Is the water regularly tested (min. per annum) - 0.5
36. How frequently are staff feedback exercises carried out relating to general workplace environment satisfaction? Every 1 to 2 years – 2; Every 2 to 3 years – 1; 3+ years / Never - 0
37. How frequently are noise levels monitored in the building? Every 1 to 2 years – 1; Every 2 to 3 years - 0.5; 3+ years / Never - 0
38. Is there a policy in place to encourage the use of interior plants and/or exterior landscaping? Yes – 1; No – 0

Adaptation to Climate Change

39. Has a flood risk assessment been carried out on the building? Yes – 1; No - 0
40. Is the building covered by a current business continuity plan for responding to extreme weather events e.g. sustained periods of high temperatures? Yes – 1; No - 0

Source: Investment Property Databank (2008a), p. 10 et seqq.

Appendix 9: Environmental performances of listed and private property investment vehicles as reported by Kok et al. (2010)

Rank	Company (listed)	Country	Management & Policy	Implementation & Measurement	Total Score
	Leaders in Europe				
1	Big Yellow Group	U. K.	83	83	83
2	Hammerson	U. K.	70	89	81
3	Unibail-Rodamco	France	83	67	73
4	British Land	U. K.	61	79	72
	Leaders in the U. S.				
1	Vornado Realty Trust	U. S.	83	37	55
2	Liberty Property Trust	U. S.	43	56	51
3	Douglas Emmett	U. S.	74	34	50
4	Simon Property Group	U. S.	61	40	48
	Leaders in Australia				
1	GPT	Australia	83	89	86
2	Stockland	Australia	83	80	81
3	Commonwealth Property Office Fund	Australia	91	66	76
4	Colonial First State Retail Property	Australia	87	63	72

Source: Kok, N. et al. (2010), pp. 23-25.

Rank	Company/Manager	Fund (private)	Management & Policy	Implementation & Measurement	Total Score
	Leaders in Europe				
1	Capital & Regional	CRM Fund	57	51	53
2	PRUPIM	M&G Property Portfolio	57	49	52
3	PRUPIM	The M&G Pooled Pensions Property Fund	52	49	50
8	Pramerica Real Estate	TMW Weltfonds	52	37	43
	Leaders in the U. S.				
1	Principal	Anonymous	57	51	53

2	USAA Real Estate Company	USAA Real Estate Funds (overall)	52	44	47
3	Normandy Real Estate Partners	Normandy Real Estate Funds (overall)	61	31	43
4	Brookefield Properties Corp	Brookefield Core Office Fund	57	34	43
	Leaders in Australia				
1	GPT Funds Management	GPT Wholesale Office Fund	87	86	86
2	Investa	Investa Commercial	91	80	84
3	GPT Funds Management	GPT Wholesale Shopping Centre Fund	87	54	67
4	QIC	QIC	70	17	38

Source: Kok, N. et al. (2010), pp. 29-31.

Appendix 10: Real estate sector constituents of the DJSI family

Company	Country	DJSI World		DJSI STOXX		DJSI North America		DJSI Asia/Pacific	
		Universe	Member	Universe	Member	Universe	Member	Universe	Member
Number of companies		109	16	19	5	18	2	36	9
British Land Plc.	U.K.	●	●	●	●				
CFS Retail Property Trust	Australia	●	●					●	●
CapitaLand Ltd.	Singapore	●						●	●
Commonwealth Property Office Fund	Australia	●	●					●	●
Dexus Property Group	Australia	●	●					●	●
GPT Group	Australia	●	●					●	●
Hammerson Plc.	U.K.	●	●	●	●				
Klepierre	France	●	●	●	●				
Land Securities Group	U.K.	●	●	●	●				
Lend Lease Corp.	Australia	●	●					●	●
Liberty International	U.K.	●	●	●					
Mirvac Group	Australia	●						●	●
Mitsubishi Estate	Japan	●						●	●
Plum Creek Timber Co. Inc. REIT	USA	●	●			●	●		
ProLogis	USA	●	●			●	●		
SEGRO Plc.	U.K.	●	●	●	●				
Shaftesbury Plc.	U.K.	●	●						
Stockland	Australia	●	●					●	●
Unibail-Rodamco SE	France	●	●	●					

Source: Sustainable Asset Management (SAM) Group (September 2009b).

Appendix 11: Climate Change Governance Framework (RiskMetrics)

Criteria	Weighting (%)
Board Oversight	
Board has explicit oversight responsibility for environmental affairs/climate change	12%
Board conducts periodic reviews of climate change and monitors progress in implementing strategies	
Management Execution	
Chairman/CEO clearly articulates company´s views on climate change and GHG control measures	16%
Executive officers are in key positions to monitor climate change and manage response strategies	
Executive officers´ compensation is linked to attainment of environmental goals and GHG	

targets	
Public Disclosure	
Securities filings and/or MD&A identify material risks, opportunities posed by climate change	14%
Public communications offer comprehensive, transparent presentation of response measures	
Emissions accounting	
Company calculates and registers GHG emissions savings and offsets from company projects	20%
Company conducts annual inventory of GHG emissions and publicly reports results	
Company has set an emissions baseline by which to gauge future GHG emissions trends	
Company has third party verification process for GHG emissions data	
Strategic planning	
Company sets absolute GHG emission reduction targets for facilities, energy use and travel, and provides periodic progress reports	38%
Company participates in greenhouse gas trading programs to gain experience	
Company pursues business strategies to reduce GHG emissions, minimize exposure to regulatory and physical risks, and minimize opportunities from changing market forces and emerging controls	

Source: RiskMetrics Group (November 2009), p. 12.

Appendix 12: Carbon Risk Exposure (RiskMetrics)

Carbon Risk Exposure
Strategic Governance
Geographic distribution of production assets
Energy intensity, consumption patterns and electricity source mix
Product mix – direct, indirect and embedded carbon intensity
Technology trajectory
Ability to identify and monetize new revenue opportunities
Business regimes that determine the ability of companies to recoup carbon-driven costs

Source: RiskMetrics Group (2010d).

Appendix 13: CDP Investor scheme (questionnaire)

1. Governance
Group and Individual Responsibility
➢ Where is the highest level of responsibility for climate change within your company?
➢ If it is at board committee or other executive body level: What is the mechanism by which the board committee or other executive body reviews the company's progress and status regarding climate change?
➢ If it is at a lower level: Please explain how overall responsibility for climate change is managed within your company.
Individual Performance
➢ Do you provide incentives for the management of climate change issues, including the attainment of greenhouse gas (GHG) targets?
➢ If so, who is entitled to benefit from those incentives? Explain the type of incentives.
2. Risks and Opportunities
➢ Process to identify risks and opportunities: Describe your company's process for identifying significant risks and/or opportunities from climate change and assessing the degree to which they could affect your business, including the financial implications.
Risks
➢ Regulatory Risks: Do current and/or anticipated regulatory requirements related to climate change present significant risks to your company?
➢ Physical Risks: Do current and/or anticipated physical impacts of climate change present significant risks to your company?
➢ Other Risks: Does climate change present other significant risks – current and/or anticipated – for your company?
Opportunities
➢ Regulatory Opportunities: Do current and/or anticipated regulatory requirements related to climate change present significant opportunities for your company?
➢ Physical Opportunities: Do current and/or anticipated physical impacts of climate change present significant

opportunities for your company?
- Other Opportunities: Does climate change present other significant opportunities – current and/or anticipated – for your company?

3. Strategy

Strategy
- Please describe how your overall group business strategy links with actions taken on risks and opportunities, including any emissions reduction targets or achievements, public policy engagement and external communications.

Targets
- Do you have a current emissions reduction target?
- If you do not have a target: Please explain why not and forecast how your Scope 1 and Scope 2 emissions will change over the next 5 years.
- If you are in the process of developing a target: Please give details of the target(s) you are developing and when you expect to announce it/them.
- If you have had a target and the date for completing it fell within your reporting year, please answer the following questions
  - Please explain if you intend to set a new target.
  - If you have an emissions reduction target, please give details on the following issues: target type, value of the target, unit, base year, emissions in base year (metric tonnes CO2-e), target year, GHGs and GHG sources to which the target applies, for recently completed targets only: was target met?

Emission Reduction Activities
- Please give details on the following issues to describe your company's actions to reduce its GHG emissions: actions, achieved or anticipated annual energy savings (if relevant), achieved or anticipated annual emission reductions, investment, made or planned to enable actions (if relevant), achieved or anticipated annual monetary savings (if relevant), timescale of actions and associated investments (if relevant)
- Please provide any other information you consider necessary to describe your emission reduction activities.

Engagement with Policy Makers
- Do you engage with policy makers on possible responses to climate change including taxation, regulation and carbon trading?
- If so, please describe.

4. GHG Emissions Accounting, Energy and Fuel Use, and Trading

Reporting Boundary
- Please indicate the category that describes the company, entities, or group for which Scope 1 and Scope 2 GHG emissions are reported.
  - Companies over which financial control is exercised – per consolidated audited financial statements;
  - Companies over which operational control is exercised;
  - Companies in which an equity share is held;
  - Other – please provide details.
- Are there are any sources (e.g. facilities, GHGs, activities, geographies, etc.) of Scope 1 and Scope 2 emissions within this boundary which are not included in your disclosure? If so, please give further information on the following issues: source, scope, explain why the source is excluded

Methodology
- Please give the name of the standard, protocol or methodology you have used to collect activity data and calculate Scope 1 and Scope 2 emissions and/or describe the procedure you have used.
- Please also provide the names of and links to any calculation tools used.
- Please give the global warming potentials you have applied and their origin (Gas, Reference, GWP)
- Please give the emission factors you have applied and their origin (Fuel/material, Emission factor, Reference)

Scope 1 Direct GHG Emissions
- Please give your total gross global Scope 1 GHG emissions in metric tonnes of CO2-e.
- Please break down your total gross global Scope 1 emissions in metric tonnes CO2-e by country/region.
- Where it will facilitate a better understanding of your business, please also break down your total gross global Scope 1 emissions by business division and/or facility. (Only data for the current reporting year requested.)
- Please break down your total gross global Scope 1 emissions by GHG type. (Only data for the current reporting year requested.)

Fuel Consumption
- Please use give the total amount of fuel in MWh that your organization has consumed during the reporting year
- Please break down the total figure by fuel type.

Data Accuracy
- Please estimate the level of uncertainty of the total gross global Scope 1 figure that you have supplied and specify the sources of uncertainty in your data gathering, handling, and calculations (Uncertainty range, main sources of uncertainty in your data, expand on the main sources of uncertainty in your data)

Scope 2 Indirect GHG Emissions
- Please give your total gross global Scope 2 GHG emissions in metric tonnes of CO2-e.
- Please break down your total gross global Scope 2 emissions in metric tonnes of CO2-e by country/region.
- Where it will facilitate a better understanding of your business, please also break down your total gross global

Scope 2 emissions by business division and/or facility. (Only data for the current reporting year requested.)

Purchased Energy

- How much electricity, heat, steam, and cooling in MWh has your organization purchased for its own consumption during the reporting year?

Data Accuracy

- Please estimate the level of uncertainty of the total gross global Scope 2 figure that you have supplied and specify the sources of uncertainty in your data gathering, handling, and calculations (uncertainty range, main sources of uncertainty in your data, expand on the main sources of uncertainty in your data)

Contractual Arrangements Supporting Particular Types of Electricity Generation

- Do you consider that the grid average factors used to report Scope 2 emissions reflect the contractual arrangements you have with electricity suppliers?
- If not, you may report a total contractual Scope 2 figure in response to this question. Please provide your total global contractual Scope 2 GHG emissions figure in metric tonnes CO2-e.
- Please also, explain the origin of the alternative figure including information about the emission factors used and the tariffs.
- Has your organization retired any certificates, e.g. Renewable Energy Certificates, associated with zero or low carbon electricity within the reporting year or has this been done on your behalf?
- If so, please provide details including the number and type of certificates.

Scope 3 Other Indirect GHG Emissions

- Please provide data on sources of Scope 3 emissions that are relevant to your organization (sources of Scope 3 emissions, emissions (in metric tonnes of CO2-e), methodology, if you cannot provide a figure for a relevant source of Scope 3 emissions, please describe the emissions)

Emissions Avoided Through Use of Goods and Services

- Does the use of your goods and/or services enable GHG emissions to be avoided by a third party?
- If so, please provide details including the anticipated timescale over which the emissions are avoided, in which sector of the economy they might help to avoid emissions and their potential to avoid emissions.

Carbon Dioxide Emissions from Biologically Sequestered Carbon

- Please provide your total carbon dioxide emissions in metric tonnes CO2 from the combustion of biologically sequestered carbon i.e. carbon dioxide emissions from burning biomass/biofuels

Emissions Intensity

- Please describe a financial and an activity-related intensity measurement for the reporting year for your gross combined Scope 1 and Scope 2 emissions (type of emissions intensity measurement, units, the resulting figure for Scope 1 and Scope 2 emissions, please explain if not relevant and alternatively provide any contextual details that you consider relevant to understand the units or figures you have provided.

Emissions History

- Do the absolute emissions (Scope 1 and Scope 2 combined) for the reporting year vary significantly compared to the previous year?
- If so, please explain why they have varied and why the variation is significant.

External Verification/ Assurance

- Please give detailed information indicating the percentage of reported emissions that have been verified/assured and attach the relevant statement (Scope 1 Scope 2 Scope 3 emissions)

Emissions Trading and Offsetting

- Do you participate in any emission trading schemes?
- If so, give information for each of the emission trading schemes in which you participate (scheme name, time period, allowances allocated, allowances purchased, verified emissions, details of ownership i.e. owned/ operated/or both)
- What is your strategy for complying with the schemes in which you participate or anticipate participating?
- Has your company originated any project-based carbon credits or purchased any within the reporting period?
- If so, give detailed information (credit origination/credit purchase, project identification, project documentation URL, verified to which standard, number of credits (metric tonnes CO2-e), credits retired, purpose e.g. compliance)

5. Climate Change Communications

Climate Change Communications

- Have you published information about your company's response to climate change/GHG emissions in other places than in your CDP response?
- If so, in your Annual Reports or other mainstream filing? Please attach your latest publication(s).
- Through voluntary communications such as CSR reports? Please attach your latest publication(s).

Source: Carbon Disclosure Project (2010b), p. 2 et seqq.

Appendix 14: ISO 14001 checklist

1. Scope

Scope of Certification

- What is the scope of EMS and what scope is being assessed for certification?
- Does it include those environmental aspects which you can control or over which you could be expected to have an influence?

- Is the scope of the EMS defined and documented within the organization's EMS documentation?
- Are there activities that are excluded from the scope of the EMS and are the reasons for exclusion acceptable?

2. Environmental Policy

Environmental Policy

- Has top management defined the organization's environmental policy?
  - f) Is the policy consistent with the scope of the EMS?
  - g) Is the policy appropriate to the nature, scale and environmental impacts of your activities and products?
  - h) What commitment does your policy make to continual improvement?
  - i) What commitment does your policy make to the prevention of pollution?
  - j) How does the policy include a commitment to comply with relevant environmental legislation and regulations, and with other requirements to which you subscribe that relate to your environmental aspects e.g. industry guidelines)?
  - k) Does the policy provide the framework for setting and reviewing environmental objectives and targets?
  - l) How is the policy documented, implemented and maintained and communicated to all persons?
  - m) How is the policy available to the public?

3. Planning

Environmental Aspects

- Has the organization established, implemented and maintained a procedure to identify the environmental aspects of activities, products or services that are within the scope of its EMS, and that:
  - a) It can control
  - b) Over which it can be expected to have an influence
- Does this include planned or new developments, or new or modified activities, products and services?
- How does the procedure determine those aspects that have or can have significant impacts on the environment?
- Are the details of these assessments documented?
- Are significant aspects considered throughout all the EMS processes (e.g. documentation, communication, emergency preparedness and response, internal audits)?
- Is the procedure maintained?
- How is the information on the environmental aspects documented and kept up to date?

Legal and other Requirements

- Has a procedure been established and implemented to identify and have access to applicable legal and other requirements which your organization subscribes to that are directly applicable to the identified environmental aspects?
- How is this procedure maintained?
- How do you ensure that you have access to all of the legal requirements, including codes of practice, that apply to the environmental aspects of your activities, products and services?
- Does the procedure determine how legal and other requirements apply to the environmental aspects?
- Are the legal and other requirements taken into account in establishing, implementing and maintaining the EMS (e.g. objectives, monitoring and measuring, auditing)?
- Is the person responsible for identifying and determining how the legal and other requirements apply competent to undertake the task?

Objectives, Targets and Programs

- Has your organization established, implemented and maintained documented environmental objectives and targets?
- Have these been established at relevant functions and levels within the organization?
- Has your organization established, and maintained a program for achieving its objectives and targets?
- Are the objectives and targets measureable and are they consistent with the following:
  - a) Environmental policy?
  - b) Legal and other requirements?
  - c) Prevention of pollution?
  - d) Continual improvement?
- When setting your objectives and targets how do you consider:
  - a) Legal and other requirements?
  - b) Significant environmental aspects?
- How do you consider:
  - a) Technological options?
  - b) Financial, operational and business requirements?
  - c) The views of interested parties?
- Who is responsible at the different levels of your organization for implementing the programs?
- What are the means and timeframes for achieving the different objectives and targets?
- How does the organization ensure that programs are amended as a result of new developments, new or modified activities, products and services?

4. Implementation and Operation

Resources, Roles, Responsibility & Authority

- How are the roles, responsibility and authorities defined and documented and communicated in order to achieve effective environmental management?
- How does management provide resources essential to establish, implement, maintain and improve the EMS?

- Does the resources include:
  a) Human resources?
  b) Specialized skills?
  c) Organizational infrastructure?
  d) Technology?
  e) Financial resources?
- Has the top management appointed a specific representative for the EMS?
- Does the role of the representative include the defined roles, responsibilities and authority for:
  a) Ensuring that EMS requirements are established, implemented and maintained in accordance with ISO 14001?
  b) Reporting on the performance of the EMS to top management including recommendations for improvement?

Competence, Training and Awareness

- How does your organization ensure that all persons working for them, or on their behalf are competent to undertake the tasks that can cause significant environmental impacts?
- Has your organization retained competency records?
- How does the organization identify training needs associated with the significant environmental aspects and the EMS?
- Has training, or other actions required to meet these needs been delivered, associated records retained?
- Has a procedure been established, implemented and maintained to ensure that the people working for, on behalf of your organization are aware of:
  a) The importance of conformity with the environmental policy and procedures and with the requirements of the EMS?
  b) The significant environmental aspects and related actual or potential impacts associated with their work activities and the environmental benefits of improved personal performance?
  c) Their roles and responsibilities in achieving conformity with the requirements of the environmental management?
  d) The potential consequences of departure from specified operating procedures?

Communication

- As relevant to its environmental aspects and EMS, has your organization established, implemented and maintained procedures for:
  a) Internal communication between the various levels and functions of your organization?
  b) Receiving, documenting and responding to relevant communication from external interested parties?
- Has the organization decided whether to communicate externally about its significant environmental aspects?
- Has your decision in this regard been documented?
- If the decision has been made to communicate this information, has the organization established and implemented the methods for this communication?

Documentation

- Does your organization's EMS documentation include:
  a) The environmental policy, objectives and targets?
  b) A description of the scope of the EMS?
  c) A description of the main elements of the EMS, their interaction and reference to related documents?
  d) Documents and records required by the standard?
  e) Documents, including records, necessary for the effective planning, operation and control of processes related to its significant aspects?
- How is this maintained?

Control of Documents

- Has your organization established, implemented and maintained a procedure for controlling all documents required by ISO 14001?
- Does the procedure address:
  a) Who approves the documents for adequacy before they are issued?
  b) How they are periodically reviewed, updated and re-approved as necessary?
  c) How changes and the current revision status are identified?
  d) How current versions of relevant documents are made available at points of use?
  e) How the legibility and identification of the documents is ensured?
  f) How external documents, as determined by the organization for effective planning and operation of the EMS are identified and controlled?
  g) How to prevent obsolete documents against unintended use, and apply suitable identification to them if they are retained for any purpose?

Operational Control

- How has your organization identified and planned those operations that are associated with significant environmental aspects in line with its policy, objectives and targets?
- How have these activities been planned, including maintenance, in order to ensure that they are carried out under specific conditions that includes:
  a) Establishing, implementing and maintaining documented procedures to cover situations where their absence could lead to deviations from the environmental policy and the objectives and targets?
  b) Stipulation operating criteria in the procedures?

c) Establishing, implementing and maintaining procedures related to the identified significant environmental aspects of goods and services used by the organization and communicating applicable procedures and requirements to suppliers and contractors

Emergency Preparedness and Response

- Has your organization established, implemented and maintained a procedure to identify the potential emergency situations and potential accidents that can have an impact on the environment?
- Are significant environmental aspects considered in the emergency preparedness and response procedure?
- Does the procedure cover how the organization will respond to these situations?
- How do these procedures allow for the prevention and mitigation of the adverse environmental impacts that may be associated with actual emergency situations and accidents?
- How does the organization periodically review and revise its emergency preparedness and response procedures, particularly after the occurrence of accidents or emergency situations?
- Have you periodically tested such procedures?

5. Checking and Corrective Action

Monitoring and Measurement

- Has your organization established, implemented and maintained a procedure to monitor and measure, on a regular basis, the key characteristics of its operations that can have a significant impact on the environment?
- How does this procedure include the recording of information to monitor:
  a) Performance?
  b) Relevant operational controls?
  c) Conformity with the organization's environmental objectives and targets?
- How is monitoring and measuring equipment calibrated or verified and maintained?
- Are calibration or verification records retained?

Evaluation of Compliance

- Has your organization established, implemented and maintained a procedure for periodically evaluating its compliance with the applicable legal and other requirements?
- Are the records of the results of these periodic evaluations maintained?
- ***Nonconformity, Corrective Action and Preventive Action***
- Has the organization established, implemented and maintained a procedure for:
  a) Dealing with actual and potential non-conformities and
  b) Corrective and preventive action?
- Do the procedures define requirements for:
  a) Identifying and correcting non-conformities and taking action to mitigate the resulting environmental impacts?
  b) Investigating the non-conformities, determining their causes and take action to avoid their recurrence?
  c) Evaluating the need for actions to be taken to prevent non-conformities, and implementing appropriate actions?
  d) Recording the results of corrective and preventive actions taken?
  e) Reviewing the effectiveness of corrective and preventive actions?
- Are the responsibilities and authorities for this process defined?
- How is this procedure updated?
- How do you decide that the action(s) taken to eliminate the causes of actual and potential non-conformities are appropriate to the magnitude of the problem(s) and the environmental impact(s) encountered?
- How do you ensure that changes are made in the EMS documentation?
- ***Control of Records***
- Has your organization established, implemented and maintained procedures for the identification, storage, protection, retrieval, retention and disposal of environmental records?
- How are these updated?
- Do these records include those that are necessary to demonstrate conformity to the requirements of the standard and include, for example, records of:
  a) Competence, training & awareness?
  b) Communication?
  c) Evaluation of compliance with legal and other requirements? Monitoring and measurement?
  d) Corrective & preventive action?
  e) Internal audits?
  f) Management review?
- Are the records legible, identifiable and traceable?
- How do you store the environmental records in such a way that they are readily retrievable and protected against damage, deterioration or loss? ,

Internal Audit

- Has your organization planned, established, implemented and maintained a program and procedures for periodic internal audits to be conducted?
- Do these internal audits determine whether or not the EMS:
  a) Conforms to planned arrangements for environmental management including the requirements of this standard, and
  b) Has been properly implemented and maintained?
- How does the audit program take into consideration the environmental importance of the operations concerned,

and the results of previous audits?
- How does the organization provide information on the results of audits to management?
- Does the audit procedure cover:
  a) The responsibilities and requirements for planning and conducting audits, reporting results and retention of associated records?
  b) The determination of audit criteria, scope, frequency and methods?
- How does the selection of auditors and the conduct of audits ensure objectivity and impartiality of the audit process?
- How is auditor competency determined?

6. Management Review

Management Review
- Has your organization's top management (at planned intervals) reviewed the EMS, to ensure its continuing suitability, adequacy and effectiveness?
- Does the review include assessing opportunities for improvement and the need for changes to the EMS, including the environmental policy and targets?
- Do the inputs to management review include:
  a) Results from internal audits and evaluations of compliance with legal and other requirements?
  b) Communication from external parties, including complaints?
  c) The environmental performance of the organization?
  d) The extent to which the objectives and targets have been met?
  e) The status of corrective and preventive action
  f) Follow-up actions from previous management reviews
  g) Changing circumstances, including developments in legal and other requirements related to its environmental aspects, and
  h) Recommendations for improvement?
- Do the outputs from the management review include decisions and actions related to possible changes to the environmental policy, objectives, targets and other elements of the EMS, consistent with the commitment to continual improvement?
- Are the records of the management reviews retained?

Source: Piper, L. et al. (2003), pp. 40–42.

Appendix 15: GRI Reporting Guidelines

Profile

1. Strategy and analysis
2. Organizational profile
3. Report parameters
   a) Report profile
   b) Report scope and boundary
   c) GRI content index
   d) Assurance
4. Governance, commitments, and engagement
   a) Governance
   b) Commitments to external initiatives
   c) Stakeholder engagement

Economic

Disclosure on management approach
- Goals and performance
- Policy
- Additional contextual information

Economic performance indicators
- Aspect: Economic Performance
- Aspect: Market Presence
- Indirect Economic Impacts

Environmental

Disclosure on management approach
- Goals and performance
- Policy
- Organizational responsibility
- Training and awareness
- Monitoring and follow-up
- Additional contextual information

Economic performance indicators
- Aspect: Materials
- Aspect: Energy
- Aspect: Water
- Aspect: Biodiversity
- Aspect: Emissions, effluents, and waste
- Aspect: Products and services
- Aspect: Compliance
- Aspect: Transport
- Aspect: Overall

Social

Labor practices and decent work
Disclosure on management approach
- Goals and performance
- Policy
- Organizational responsibility
- Training and awareness
- Monitoring and follow-up

Society
Disclosure on management approach
- Goals and performance
- Policy
- Organizational responsibility
- Training and awareness
- Monitoring and follow-up

➢ Additional contextual information ***Economic performance indicators*** ➢ Aspect: Employment ➢ Aspect: Labor/Management relations ➢ Aspect: Occupational health and safety ➢ Aspect: Training and education ➢ Aspect: Diversity and equal opportunity ***Human Rights*** ***Disclosure on management approach*** ➢ Goals and performance ➢ Policy ➢ Organizational responsibility ➢ Training and awareness ➢ Monitoring and follow-up ➢ Additional contextual information ***Economic performance indicators*** ➢ Aspect: Investment and procurement practices ➢ Aspect: Non-discrimination ➢ Aspect: Freedom of association and collective bargaining ➢ Aspect: Child labor ➢ Aspect: Forced and compulsory labor ➢ Aspect: Security practices ➢ Aspect: Indigenous rights	➢ Additional contextual information ***Economic performance indicators*** ➢ Aspect: Community ➢ Aspect: Corruption ➢ Aspect: Public policy ➢ Aspect: Anti-competitive behavior ➢ Aspect: Compliance ***Product Responsibility*** ***Disclosure on management approach*** ➢ Goals and performance ➢ Policy ➢ Organizational responsibility ➢ Training and awareness ➢ Monitoring and follow-up ➢ Additional contextual information ***Economic performance indicators*** ➢ Aspect: Customer health and safety ➢ Aspect: Product and service labeling ➢ Aspect: Marketing communications ➢ Aspect: Customer privacy ➢ Aspect: Compliance

Source: Global Reporting Initiative (2006), pp. 5, 20 et seqq.

Appendix 16: British Land's investment critical sustainability issues

1. Site and Neighborhood	
Biodiversity	• Designated nature reserves located on or close to the site (for example, Sites of Special Scientific Interest (SSSI), Special Areas of Conservation, Local Nature Reserves). • Known protected species on site and measures that are in place to protect and/or enhance the habitats of these species. • Invasive plant species present at the site (e.g. Japanese Knotweed and Giant Hogweed).
Land Use – Brownfield Land	• Key findings of the Contaminated Land Due Diligence assessment (including current/historic land uses at or near the site, active or former landfills within vicinity of the site, contamination risk associated with: blight, expenditure on site investigation and remediation, legal liabilities, insurance).
Energy	• Energy ratings of the proposed/existing development.
Environmental Conditions - Noise	• Noise Abatement Zones on, or within the vicinity of, the site.
Flood Plain	• Nearest area where the Environment Agency has estimated a 0.1% or greater chance of flooding per year.
Heritage	• Particular archaeological or heritage resources on, or within the vicinity of, the site (e.g. Listed Buildings, Scheduled Ancient Monuments, designated areas of archaeological importance, ancient landscapes, battlefields, London Squares, Registered Parks and Gardens).
Local Character, Distinctiveness and Pride	• Conservation Areas or other areas designated by the Local Planning Authority for its landscape character on, or within the vicinity of, the site.
2. Resource Consumption	
Materials	• Existing survey reports for asbestos-containing materials, asbestos registers and written plans for managing risk associated with asbestos within buildings, in accordance with the Control of Asbestos at Work Regulations (2004).
3. User and Occupant Satisfaction	
Health and Safety	• Evidence of compliance with H&S legislation.

Source: British Land (2009b), p. 11.

Appendix 17: British Land's potential sustainability value issues in property acquisition

1. Site and Neighborhood	
Environmental Conditions –	• Location of any Air Quality Management Areas within the vicinity of the site.

Air Quality	
Transport	• Bus routes/tube lines/train lines that are accessible within 10 minutes walk of the site; • Designated cycle routes within the vicinity of the site; • Existing cyclists facilities, including bicycle storage provision in relation to the standard required by the Local Planning Authority; • Existing parking spaces in relation to the standard set by the Local Planning Authority.
Land Use	• Presence of any high grade agricultural land (Grades 1 to 3a) on, or close to, the site.
Utilities	• Presence of any major utilities infrastructure crossing through, or close to, the site
2. Resource Consumption	
Energy	• Potential for renewable energy/energy efficiency technology on site (e.g. south sloping site will have more opportunities for passive solar energy, shallow aquifers may make the site suitable for ground source heating and cooling). • Provision within the development design for on-site renewable energy generation. • Energy efficiency of the design. • Percentage, if any, of the overall predicted energy consumption of the development is provided by on-site renewable energy.
Waste Management	• Segregation and storage facilities for waste recycling. • Requirement for demolition of extensive existing structures on site.
Benchmarks	• Ratings obtained from any standardized sustainability assessments undertaken for the development (e.g. BREEAM, EcoHomes).
3. Environmental Quality	
Landscape	• Location of Conservation Areas, designated greenbelt or other designated landscape areas within the vicinity of the site. • Tree Protection Orders applicable to the site
Water Resources	• Location of vulnerable surface or groundwater resources within the vicinity of the site. • Potential for discharge volumes from site to be significantly less than for the proposed end use (e.g. if the site is currently derelict, greenfield, scrubland or in low-intensity use). • Incorporation of Sustainable Drainage Systems into the development.
Water Use	• Water efficiency measures included within the design of the development. • Predicted/existing water consumption rates of the development.
Environmental Management	• Implementation of an Environmental Management System for the operation of the development.
4. User and Occupant Satisfaction	
Connectivity	• Walking distances to and from retail and community facilities in the surrounding area.
Employment	• Jobs are currently provided on the site. • Potential for net gain or loss of employment on site with development of site.
Access	• Disability Discrimination Act (DDA) compliance.
Public Realm	• Distance to the nearest public open space or amenity area.
5. Environmental Quality	
Adaptability	• Ability of buildings and open spaces to accommodate shifts in user requirements with the minimum resource costs.
Community	• Presence of strong community groups or existing community relationships which may affect the operation of the development. • Planning designations identifying deprived communities within the vicinity of the site. • Number and location of community facilities/schools/health facilities within 1km of the site.
Existing Businesses	• Number of existing businesses on site. • Existence of any agreements with businesses which have been displaced to be accommodated within the new site/development.
Regeneration	• Areas designated for regeneration by the Local Authority within the vicinity of the site.

Source: British Land (2009b), pp. 12-14.

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